The Builder.

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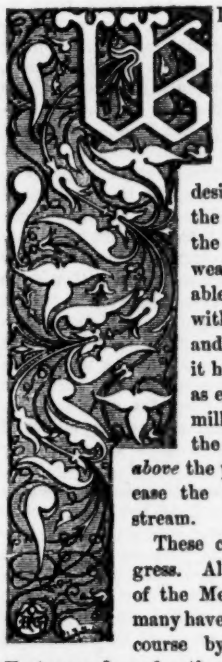
Metropolitan (Underground) Railway: Central Railway Station in the City.



WITH railways below the ordinary roads, the roads themselves widened, straightened, increased in number, especially by one along the river side, and furnished, where desirable, with tram-ways, the accumulated millions of the metropolis, and its wealth of equipages, will be able for a time to circulate with something like ease; and when, a few years hence, it has still further extended, as extend it will, and another million has been added to the population, a viaduct *above* the principal road may again ease the block and liberate the stream.

These changes are fast in progress. All our readers have heard of the Metropolitan Railway, and many have been turned out of their course by the stoppage of the Euston-road and other thoroughfares, by the works necessary for its formation. Probably, however, the engraving and plan we give in our present number* will afford to the public the first clear idea of what it really is, and of what has been done.

The view shows the double bell-mouth and groining at King's-cross, which are formed to allow the junction of two branch lines by which this railway is connected with the Great Northern Railway. The whole of this bell-mouth is executed in brick-work,—the greatest span being about 45 feet. The road on the left shows the line to the east side of the Great Northern, and is completed.

The two branch lines, passing as they will do on each side of the Great Northern Station, will enable trains to work continuously from stations on the Great Northern to the City without interruption, and without crossing any of the main lines of rail; thus practically extending that railway into the City, and by the authorized London, Chatham, and Dover Railway, &c., to Brighton and the Continent. The main line, seen on the right, is being carried forward to Victoria-street and Smithfield.

At the western end the Metropolitan Railway joins the Great Western Railway, extending it likewise into the City, thus placing the Great Western Railway on an equal footing with the Great Northern in respect of City communication.

The Metropolitan line will be made on the mixed gauge, so that it can be worked by broad or narrow gauge stock. The arch is 28 feet 6 inches span in the clear, formed with six rims of 4½ inches work, in hydraulic mortar. The height is 16 feet 6 inches from the rails.

The portion of the line which passes under roads and streets will be in a covered way, as in our view; but where it traverses private property it will lie in open cutting, with retaining walls. Gas will supply the place of the sun where it is tunnelled. The stations will all be open to daylight, and the carriages will be lighted artificially.

Besides terminal stations, there will be intermediate stations in the Edgware-road, Baker-street, Portland-road, Gower-street, King's-cross, and Victoria-street, or Smithfield.

* See p. 41.

The interferences with sewers are necessarily considerable; but they have always been discussed and arranged with the engineers of the various Boards of Works, and no inconvenience has in most cases resulted. The "Fleet ditch" passes over the railway in a large iron tube, visible in the branch line to the Great Northern. Many large gas and water mains have been exposed: some have been removed, and placed away from the works; others have been supported temporarily, and left almost in the position in which they were found.

A considerable portion of the line is already constructed, and the works are now in progress in Praed-street, Paddington; Chapel-street; in the Marylebone-road, near Northumberland-street, and at Portland-road; near King's-cross; and in Coppice-row, near Victoria-street.

The material through which the line is formed, is, at the West-end, sand and gravel, with its usual accompaniment of much water; and at the East-end, the London clay. The present severe weather has stopped the progress of the open work; but the portions which are "driven," progress much as usual, as the temperature is much higher below than on the surface.

Mr. John Jay is the contractor for the eastern portion, namely, from the City to St. Pancras New Church; and Messrs. Smith & Knight take it up there, and are carrying it on to Paddington. Mr. Houslander is Mr. Jay's representative on the spot. Mr. John Fowler is the engineer-in-chief: Mr. T. Marr Johnson, the resident engineer.

Returning to the portion we are illustrating, what we have said will suffice to show that it is a work of no common difficulty,—a work calculated to keep awake all who are concerned in it. Some of it was effected in a cutting 65 feet wide, with the weight of houses on both sides pressing against it. It was got out in sections at intervals, and then the intermediate parts were filled in.

Going westward from the part finished, a waggon-way, or heading, is driven, and formed with whole-timber uprights, heads, and cills, with 1¼-inch or 1½-inch boarding, using about 50 feet cube of timber in every yard. The earth, then, being removed above this is shot down into waggons, taken by temporary rails to the Great Northern, and so to Wood-green. About 500 yards of stuff are taken out every day. A sump, we may add, is formed near the junction we have illustrated, into which any water that may accumulate is drained, to be thence pumped out. At present the tunnel looks very dry. At the angle of the junction, it will be seen in the plan, an apartment is formed, with a brick dome, for the telegraph, and there are other small apartments for lamps and attendant. At the other end of the line the excavated material is taken away, in a similar manner to that just now described, to Brentford, to form an embankment there. Much of the gravel is used in the works for concrete and as ballast.

When the Metropolitan line joins the Chatham and Dover, in Farringdon-street, it will constitute the first railroad through the heart of London.

In connection with the subject to which we are referring,—a subject of the utmost importance to the metropolis,—we must mention the plan for the concentration of railway stations at the north end of Farringdon-street, proposed by Mr. J. B. Bunning, the City's architect, the Improvement Committee having requested him to consider "whether the establishment of a central railway station in the City of London (say in the neighbourhood of Smithfield), for the purpose of connecting therewith the whole of the existing and contemplated railways, be desirable and practicable." Mr. Bunning took into account,—the large amount of land now unoccupied in Victoria-street; the approach of the Dover and Chatham line at the foot of Snow-hill; the proposed Metropolitan Station in Victoria-street; the unprofitable occupation of Farringdon-market; the supply of meat to the proposed new meat-market; and, above all, the inconvenient and dangerous gradients of Holborn-hill, Skinner-street, and Snow-hill,—and came to the conclusion, that the formation of a Central Railway Station would be both "desirable and practicable" at the north end of Farringdon-street. The design, if carried out, would not only afford an opportunity of uniting all the existing and contemplated railways, but would connect the entire network of rails with the proposed new meat-market in Smithfield. It lifts the valley of the Fleet, at one point 12 feet 6 inches, thereby improving the acclivity of Holborn-hill, by reducing the gradient from one in nineteen to one in forty, and that of Skinner-street to one in forty-five, an improvement which, with especial regard to the public convenience, can scarcely be over-estimated. It suggests a profitable employment of the site of Farringdon-market, and the large amount of unoccupied land in Victoria-street; and, whilst pulling down much of the smaller property from Long-lane westward to Holborn-hill, contemplates very desirable street improvements in that and the surrounding locality.

The committee approving of the scheme recommended it to the Court of Common Council and asked to be authorized to prosecute the inquiry, by conferring with the Government, the railway companies, and other parties upon the subject. The court afterwards directed the committee to carry out their report, and we are much disposed to believe that further inquiry will show the advisability of the plan and the means by which it may be effected. What we have been long calling for, the connection of the various lines of railways east, west, north, and south of the metropolis, to remove it from its present absurd position of being actually a block in the way of all through traffic, is now fast approaching completion, and this very excellent plan of Mr. Bunning's will materially aid in bringing about the much-desired result. It will further afford an opportunity to make this a fine part of London. Let it be taken advantage of with a will. Enormous sums would necessarily be expended by the corporation and the various bodies interested in carrying out the idea, and profitably expended too, and this should be done with a view also to general effect, and with a full appreciation of the value of the beautiful.

"A PLEA FOR POLYCHROMY."

THE ARCHITECTURAL MUSEUM.

ON Wednesday evening, the 9th inst., a lecture was delivered by Mr. William White, the subject being a "Plea for Polychromy." The lecturer first insisted upon the necessary existence of polychromy in architecture, and pleaded for a further introduction of colour largely for its own sake in architectural interiors. He appealed to man's intuitive love for colour as illustrated in a variety of ways, and to the analogy of nature. He then referred to the value of "unconscious influences," and to the manner in which men are affected by colour even though unconscious of its presence, and called attention to the necessity of colour in order to the healthy state of the eye and brain, and the consequent cruelty which its withdrawal inflicted upon the sick and the poor. We give some portions of the lecture.

Colour is one of the elements of our art—as much so, indeed, as form, texture, or proportion. Our houses may be whitewashed from top to bottom, roofs and walls alike, as in the Bermudas and Newfoundland, or in the cottages nestling in the sides of the dark grey mountains of North Wales. But this again shows the value and effect which the presence of colour existing in all material has in the humblest architecture, seeing that the very absence of the ordinary local colour, which lies hid beneath a coat of lime, forces itself upon the most casual observer as an instance of striking peculiarity—picturesque, perhaps, in its way, but not commending itself for universal imitation in other parts of the world; not that the employment of white as a colour is to be deprecated, either in exterior or in interior architecture, but the sweeping concealment of all local colouri not suggestive of necessity, or of high art, whereas the smallest artistic, or even systematic selection and arrangement of such colour does display design. There must, I say, be some colour, and

if the work has any pretensions to art, selection is made, and other collateral considerations are duly weighed, as to its treatment.

In the consideration of colour for its own sake, and apart from any such accidental existence of colour in natural material, a great deal might be said of the value and fitness upon the ground of the constitution of human nature, in regard of his imagination and intellectual parts; but apart from this, I hope to show that it is not and ought not to be considered a matter of mere fancy gratification or choice, but of absolute and positive right or wrong. Many of us are content to live on with a knowledge of but comparatively few of the natural causes influencing our happiness and welfare. Through the advancement of science these are continually being brought out. The beneficial effects, *e.g.*, of light and air in our dwellings are now becoming every day better received and acted upon. The good effect, even upon the poor and uneducated, of association and companionship with forms good and true, rather than with such as are base and unworthy, are, through the means of constant philanthropic observation and research, better understood and valued accordingly. And since colour has an influence upon us, of which very many are scarcely aware, let us, in like manner, endeavour next to trace out a few of the facts and phenomena of nature in order to pursue our study of natural causes into the territory of chromatic art, and then let us look at the bearing of these facts upon the workings of "unconscious influences"—for notwithstanding all our keen observation of common things, and our pride of independence upon anything that we do not perfectly understand, such influences have a greater and more permanent effect upon us than those of which cause and effect are more immediately apparent. And first let us consider a few of men's natural instincts as to the love of colour.

Most remarkable, perhaps, is the love for colour intuitive in little children. It is almost the first thing that attracts infantile interest and affords delight. With very many grown persons the home associations connected with the days of their childhood are recalled by the sight of beautifully-coloured objects, such as flowers, butterflies, or birds. It is, indeed, chiefly to the well-trained, home-loving, and self-disciplined mind that such memories of the past are present; but herein, again, is shown that the association itself is good and true, and to be encouraged as an innocent and beneficial refreshment, whose effect does not pass away with the fleeting moments of early life, but, if we may credit the testimony of many an aged man, remains by one to cheer the loneliness of age, as is again and again proved by the testimony of those who have experienced its virtue. I have myself heard the aged invalid speak of the great relief afforded by the eye resting even on the flowing pattern of a common wall-paper, during recovery to consciousness from severe attacks of illness, the eye, at first, but imperfectly taking in either the form or the colour, day by day regaining its power and proper action with increasing strength, and finding pleasure in following the coloured lines, which imparted an interest to an otherwise blank and wearisome gaze upon apparently vacant space.

Most men have, more or less, an appreciation of, or at any rate some love for, colour, and no one in good health naturally has an abhorrence of colour in itself. Very many show apparently a great indifference to it, who yet feel the coldness and discomfort of its being withdrawn, and who seem unconsciously to choose the very works exhibiting the choicest colour, which a highly cultivated taste would have selected as good. They will select the very spots for rest or retirement which present the strongest attractions in respect of colour. Good colour, in fact, does impart a finished and cheerful effect, to which but few are wholly insensible, whatever their ideas or professions may be with respect to its influence. Not that colour, irrespectively of its quality and harmony, will afford rest or pleasure, any more than the jingling, discordant, harsh, or grating tunes of the street-grinders will satisfy the ear; yet even here one is sometimes struck with the exuberant, though genuine, delight expressed by the uneducated at the poorest colouring, or the lowest class of music.

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Whether subjects, or single figures, may or may not receive a considerable amount of colouring, in order to obviate the effect of being too much detached from that of which they may form a portion in the general treatment, necessarily depends upon the particular circumstances of the case, and it is scarcely within the scope of my subject to inquire further. But it is perfectly compatible with the nature of my plea to allow, nay, to urge, that the finer the subject as a work of sculpture, the less ought to be the amount of colour applied; supposing some colouring to be needful in order to harmonize the work with the building in which it is placed. But, in fact, the question of applying paint to those much-admired sculptures whose beauty depends chiefly upon the delicate chiselling of the artist's own hand, in no manner applies to the present case. His selection of a hard and close-grained material of pure colour and fine texture, may afford, it is true, a fair pretext for the denunciation of paint *in toto*, as applied to sculpture. But it is altogether beside the question, for such treatment of such sculpture never has been, nor ever will be, soberly entertained. Nevertheless, when a soft and porous material, incapable of carrying a fine edge, one whose texture is improved and hardened by the application, is employed, there is not the same *primâ facie* 'ground against the use of paint; it cannot be classed in the same category; and thus on the one hand, we may safely say, that the richer or finer the material, and the deeper or more delicate the work, the less need is there of elaborate colouration; whilst, on the other hand, where extensive plain surfaces, or poor materials, are employed, the need of colour is all the more felt, and colour becomes, as it were, absolutely indispensable. But, perhaps, the strongest popular argument put forth by the opponents of polychromy is that of reference to the example of our ancient uncoloured cathedrals as compared with the wretched attempts at an improved state of things in some of the works of our Continental neighbours, *e.g.*, the solemn dignity of our Abbey Church of St. Peter, Westminster, with the smartly decked-out interior of Notre Dame at Paris. I am quoting no imaginary case. It is one that is continually brought forward to illustrate the bad taste of a profusion of colour and the beauty of its absence, and the anti-colourist rejoices in having such a crushing argument to throw in the teeth of the polychromatists, proving, as we conceive it must, to every one's satisfaction, the unfitness of colour for architectural interiors; whilst he maintains that it is the excess of colour which has produced such unsatisfactory results. Again and again, Notre Dame is set up as the polychromatists' idol, to be demolished by ruthless defenders of form against colour.

Let the anti-colourists look to it, for if they cannot produce a more dangerous enemy than this, it shows but a hopeless cause. Their argument is plausible, and, no doubt, well meant; and if they really and truly believe that we regard Notre Dame in any other light than as a warning against the abuse of colour, they are, to some extent, justified in their dread of its introduction on a large scale—much as they do us and the cause which we advocate injustice by such imputations.

But, further than this, it is not to the profusion of colour, but to the improper diffusion of colour, and to the unsatisfactory mode of its application, that its ill effects in Notre Dame are to be attributed, our adversaries themselves being judges; for even they allow that the interior effect of the beautiful little chapel of La Sainte Chapelle, in the same city, although containing at the least five times the proportionate amount of colour, is so immeasurably superior to that of Notre Dame, as to be beyond the reach of comparison with it.

And, on the other hand, to quote Westminster Abbey as an instance of the superiority of uncoloured effect, is just as wide of the question in another direction. In the first place—gladly agreeing to the alleged superiority of the interior of Westminster Abbey over almost any other church or cathedral in Christendom—I maintain that the amount of actual colour in Westminster Abbey is very far above the average, not only in the buffs and greys which age has spread upon the surface, but also in the gilding and positive colours shining through the coating, though not in sufficient strength to convey a distinct impression of what it must have been when it came forth from the hands of the guild that directed its completion; but it would be, to say the least, as fair for us to claim it, as giving its testimony in favour of colour, as it is to ignore the presence of colour, and call Westminster Abbey an instance of an uncoloured interior. The appeal, too, to our more evidently uncoloured interiors fails as a precedent of what was done in old time, when we bear in mind how universally these were furnished with pictures, and hung with costly tapestries of polychromatic material, embossed with silver and gold.

But perhaps one of our strongest opponents is prejudice. I have known instances of a vague dread of superstition in the presumed application of "Symbolism" in the use of colours, to have so prejudiced people's minds against polychromy as to induce them to condemn it entirely for ecclesiastical purposes. Having, upon another occasion and at another place, already entered fully into the nature and mode of such applications, and into the benefits of this branch of symbolic teachings, I shall not now do more than express my concern, that sensible persons should be led away by an empty cry of this kind. And I might have expressed my surprise that men, even professing liberal views, should ever condescend to such bigotry and intolerance as to condemn, on behalf of others, a most valuable accessory to art, merely on the score of its having once been, in a dark and corrupt age, liable to dangerous misuse,—had I not long ago learned that a noisy profession of liberty of conscience always means liberty for others to do anything but what clashes with its own limited preconceived opinions. The dread of the danger suggested is akin only to that of contending that, after all the railway accidents of the last few months, it would be much safer and better if no one ever entered a railway-carriage again. That we are, or ought to be, independent of such accessories as either colour or symbolism; and that the love of colour must be in some way necessarily connected with a pitiable weakness—or still more pitiable superstition, is a species of asceticism which its advocates would at once repudiate if made applicable to their own case in domestic daily life.

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I repeat, it is not the profusion of colours which is offensive to the fastidious taste, but it is the mode of its application, its harshness, its want of harmony, its unfitness for its purpose, its imperfect treatment, arising in a very great measure from long neglect of the scientific study of chromatic law in combination with careful experiment as to its application. The question as to what would be a proper amount of colour or good treatment architecturally in any given work is as difficult to determine as any other general question relating to art in a particular instance. It fairly admits of considerable variety of opinion, and I for one shall not attempt to define it. I take my stand solely upon the general principle against those that would set aside the true merits of the case, and appeal to evidences of failure as an argument against all attempt at better things. For many an aspirant art-critic will look at a work of varied quality, containing, perhaps, extremes of good and bad taste; he will denounce or advocate, as a general proposition, some point bearing in reality upon only one element therein of failure or success; upon a branch of art but little understood he will profess to exercise a mature judgment, and will proceed to attribute to colour itself, rather than to imperfect treatment, all the evil result of an unsatisfactory work. And hence it is that has arisen the wholesale condemnation of 'colouring as such by those who have formed their notions, I will not say upon a few poor and faulty works, but upon works showing the highest order of merit in some respects, whilst in other respects they fall so far short of perfection as to present at first sight to the casual observer an appearance of discord and confusion. Hence it is, too, that a capricious public will bestow upon an unworthy object a great deal of superfluous and inapplicable admiration, which, in after-times, each individual is ashamed to own having given.

ON SOME MALVERSE REACTIONS OCCURRING IN OIL PAINT COMPOSITIONS.*

ALLEGED ADULTERATIONS OF THE LINSEED OIL.

Through the Medium of the Seed.—It has been within only the last five or six years that the fact of there being something unusual and wrong in the condition of linseed oil began to be noticed so generally as to lead to the inference that this was scarcely to be accounted for by even a great multiplication of ordinary cases of adulteration. But it has been within the still more recent period of the past couple of years that this question has assumed its present dimensions—pointing distinctly to the existence of some very generally operating cause.

The question naturally arises whether there can be traced any clear connection between all this and the changes in the localities of the growth of the *seed*, that followed upon the breaking out of the Crimean War, when, the Baltic and Black Sea ports being sealed against us, we were driven to our Indian possessions, and have since had thence the greater proportion of such supplies for the English market? And if a coincidence of this kind be proved to have

* See p. 3, *ante*.

existed, how is it that now, after the reopening of the Russian ports, and the action of a partial recurrence to the old state of things might be supposed to have worked its effects, we find the reputed condition of the oil to be worse, and not to have been restored, even partially, to its wonted condition?

Now, a careful examination into all the facts and attendant circumstances, discovers to us an unmistakable coincidence between the first symptoms of disorder in the oil and the occurrence of the Crimean war. It shows us also a double cause why the East-Indian seed oil is, to some extent, different from that obtained from the Northern seed; and it explains why we do not now, so generally as we formerly did, get genuine oil from the resupplied Russian seed.

It has been within this period,—the past five or six years,—that linseed first began and has continued to reach us in greater proportional quantities than it formerly did from Calcutta and Bombay. The "Market Reports" just issued,—that, for example, of Messrs. Rose, Graham, & Wilson, give the total importation, for the past year, as 1,255,000 qrs.; of which 550,000 were from the East-Indies, 350,000 from the Black Sea and Azoff, 260,000 from the Baltic and White Sea, and 95,000 from other ports; and this of course presents a fair average of the relative sources of the seed from which the linseed oil in the British market is now extracted.

In a former article in the *Builder* on this subject there was suggested a natural, and consequently a non-culpative explanation of the difference between the Baltic and the East India seed oils. That explanation was that side by side with the linseed of the hotter climate of India there grew other seeds, not appearing in the colder climate of the north, yielding oils that are non-drying; that these extraneous seeds, when not winnowed from the genuine linseed, gave, on crushing, a mixed oil, containing a considerable proportion of a non-drying element, and led, when applied in the composition of paints, to much, if not to all the malverse results that were being complained of.

This explanation still holds good; but a closer and more recent examination of the East-India seed oil has shown that, in addition to this source of difference, there exists another due to the presence in the Indian oil of certain elements that either do not exist, or are not so fully developed in the Russian—adventitious and extraneous constituents of climatic origin, not affecting the specific character of the oil, but of material importance in its art-applications, and when being treated for improving its drying properties,—differences which will be more particularly reverted to hereafter. And as regards the Russian, an equally explanatory fact has recently transpired, and is now well known to the oil and seed merchants, namely, that both at the Baltic ports and those of the Black Sea (and similar things *may*, though the writer cannot so certainly vouch for that, be done also at Calcutta and Bombay), it is no unusual practice deliberately and intentionally to add other and valueless seeds to the genuine linseed. In other words, to bring, it is said, these adulteratives even to the quay side, and have them "shot" in along with the real seed on the lading of the vessel under some surreptitious contrivances or connivance sufficiently ingenious for such occasions.

The kind of refuse seed chosen for this purpose is generally that of the wild rape, growing spontaneously in vast profusion on the wastes of Russia. This wild rape yields a comparatively non-drying oil; and the quantity of the seed so added has been known to have amounted to as much as 17 and, in some cases, even to more than 20 per cent. on the whole cargo.

The oil from the seed of this wild rape is essentially a non-drying oil, similar in its general properties to that of the ordinary rape, with the oil from which we are all so familiar. Such oils exposed to air on a surface of glass, become thickened or gummy, or pass into a half-indurated state at the end of several weeks or months; whilst *raw* linseed oil, similarly exposed, becomes *hard*, that is, *dries* properly, in from 70 to 100 hours; and a good drying oil, that is, linseed oil, that has been specially and properly treated to increase its drying rate, will, under like conditions, harden within a time ranging between six and twenty-four hours.

It is important to trace the consequences of the admixture of such an oil in the genuine linseed. In a mixture of a non-drying with a drying oil, the drying property of the one is not destroyed, only impeded; its proper final effects are vitiated by the presence of the non-drying element. The former dries finally notwithstanding the presence of the latter, which retains its fluidity till at least other and different actions supervene. The proper final effects that should be obtained from a drying oil are, therefore, vitiated to an extent directly proportionate to the relative quantity that may be present of the non-drying element. There takes place in such mixtures no other action than a merely mechanical one. The injurious effects of the non-drying property of the one oil are not compensated for, or overcome, or even partially so, by the drying power of the other. A degree of hardness is finally reached in such a mixture, which is the mean of the hardness proper to the solidified genuine oil, modified by the adulterative, which remains fluid. The relative proportion of the non-drying ingredient may be so small, that apparently (but illusively), its presence in no way interferes with the drying of the mixture; or, on the other hand, the quantity may be so large as obviously and palpably to impede the finally hardening of the mass. The drying element itself hardens, but the non-drying one remains fluid.

One hundred grains of linseed oil spread in a thin film over a surface of glass will, under ordinary external conditions, solidify or become dry, in (by way of a broad example), say, one hundred hours. The same quantity, similarly treated, of rape oil will undergo no perceptible change (omitting from present consideration results of all other kinds—its acidification, bleaching, &c.) in its degree of fluidity within the same period. 95 parts of linseed and 5 parts of rape will harden within the same time; but the degree of hardness attained in this case will be inferior to that reached by the pure linseed. Using 90 parts of the one plus 10 of the other, we shall then find that the maximum hardness is not, as before, reached within the 100 hours, but is driven beyond that time, and when attained, is still less in degree than in the first mixture example. The fluid particles begin now, from their presence in increased quantity, to offer impediments to the contact, and consequent solidifying action, on the particles of the linseed oil, of the atmosphere. Carrying on the trials still further, say with 85 plus 15, 80 plus 20, and so on, the time of reaching the maximum degree of hardness is as progressively extended; and the degree itself, when reached, is at every step proportionately inferior to the preceding one. The unmixed pure linseed oil in these trials will, in the end, be as hard as a paint oil ought to be *per se*. The first mixture will be less hard than this, and will yield easily to the finger-nail. The next one will be palpably soft to the pressure of the finger; and as we go on adding to the proportion of the rape, the mixtures may be made finally to set in conditions not harder than fresh-made putty, or to remain as semi-fluid as megilp.

Obviously such mixtures as these,—even that consisting of only the 5 per cent. of the non-drying rape is so,—are wholly unfit to be employed in the composition of paints.

It is not, however, in respect only of this one defective point—that of their finally inadequate hardness,—that such adulterated oils carry with them into paint compositions their malverse consequences. The particles of still fluid oil in such mixtures are left open to the action of a variety of external and internal agencies, tending to a structural disorganization of the fabric of the paint, as well as to disarrangements in its effects taking place perhaps long after the work has been done.

The sources of the evil thus shown to have their origin in the condition of the seed itself are, as already intimated, unfortunately not the only ones that exist. There still remain, in all their force, those attributable to culpative adulterations of the oil, after it has quitted the seed-crusher's hands, perpetrated in some one or other of the ramifications of the many channels it may pass through before reaching the mixing-room of the operative painter.

There exist no fats, or non-drying oils, whose properties, appearance, and price, admit of their being used to adulterate the linseed with, excepting only when obtained in this indirect manner through the seed.

The chief adulteration still continues to consist of common brown resin. Resin oil itself is but rarely attempted to be employed now.

An almost undeviating attention to the subject of linseed oil, and the habit of constant examinations of samples obtained under every variety of circumstances, give the writer the following as the general result of his experience for the last ten years, as to the condition of the *raw* (*not the boiled*) oil in the market and the shops:—

Previously to 1855, from 11 to 20 per cent. of the samples, would be found to be adulterated; the remainder to be excellent and commercially pure oil. The adulteratives at that time consisted of resin oil and of resin chiefly: the former being the rarest, and the latter the most common form. The proportion of resin to genuine oil would vary between 3 and 10 per cent.,—most commonly the quantity that had been added, was 1 cwt. to 19 of genuine oil, making up the ton. Up to the year 1855, it was seldom found that fat, or other oil, had been intermixed with the linseed, and, when found, there was always reason to think its presence accidental, or not to have adulterating objects.

After 1855 the oil became impure, through the presence of non-drying, oily matter; so that it became then the rule, and not the exception, to find the linseed oil in this condition. But the percentage of the resin adulterations, whatever the quantity of the oil otherwise, was still kept up. The percentage of the non-drying element ranged between 7 and 15 per cent. At the present time from 40 to 50 per cent. of the examined samples, taken indiscriminately from the shops, will give evidence of the presence in them of non-drying oils, and about 16 per cent. will prove to be adulterated with resin.

There is still to be met with as of old, fine genuine linseed oil,—the product of good sound unmixed seed, or of seed from which the crusher has previously winnowed the spurious interpolations.

It is to be remembered, that all this neither includes nor even touches upon the condition of the *boiled* oils in circulation.

These data, relating to the raw oil alone, and to its adulterations, incidental or culpative, though very far from serving to impeach *in toto* the entire state of our present supplies of the oil, still furnish enough to account for a very great deal of the disarrangement that is so generally felt to exist. The evils originating out of intentional adulteratings of the oil itself will form the next topic of discussion.

The prevalence of such adulterations induces another thing, namely, a feeling of regret that generally the operative painter himself is wholly unable to apply any unerring test to the oil he is handling, before he may have committed his time, and perchance his credit as an artist, to some unfortunate application of it—a desideratum it is intended to supply to him, by a few plain directions in a succeeding chapter. C. B.

ON THE CHURCHES OF LE PUY EN VELAY, AND OF AUVERGNE.*

THE external elevation of the west front (Le Puy) is shown in the photograph which I exhibit. It is similar in style to the clerestory on the north side, and mainly executed in alternate courses of lava and stone. The aisle roofs are masked by walls, with pediments. Throughout this part of the work you will observe that its early date is proved by the fact that the round arch is almost invariably used for ornament, and the pointed arch only where great strength was required. A great buttress which had been built against this west front was removed during the recent restorations.

I observed before that there are doorways on the east side of both transepts—the "ears" referred to in the old saying. The south transept door is in itself remarkable for the peculiar form of the cusping of its arch, and still more for the magnificent porch built over it. The date of this is the latter part of the twelfth century, and its character will be best understood by an examination of my drawings of it. It is open on the south and east sides, and abuts on the church on the west and north, occupying the re-entering angle between the transept and choir aisle. The arch is remarkable for a rib detached from the arch below, and connected with it by columns at intervals, so as to have the appearance of being suspended. My impression is that the architect feared that his arch had not sufficient abutment, and hoped, by bringing some of the weight on to the lower rim of the arch, to remedy this defect. The whole detail of this group is a very rich kind of Pointed, full of half Romanesque and half Byzantine detail. The groining in alternate coloured courses is quadripartite, but has the very rare peculiarity (in France) of ridge ribs. Above the porch is a room or chapel, to which I omitted to gain access. Over the door of the other (north) transept, a great arch, thrown from the cathedral

* Read by Mr. G. E. Street. See p. 18, *ante*.

to the chapel of St. John, carries another chapel, lighted with a First Pointed triplet. This door is square-headed, and covered with rich, though rude, ironwork. The door handles have a resemblance to one in the cathedral at Trêves, made by Jean & Nicholas, of Bingen, which struck me, and was remarked on also, I find, by M. Mérimée. The lintel of the door is deeper at the centre than at the sides of the door—pediment like—and has figures of our Lord and the twelve Apostles carved on it; whilst above, under a circular arch, is another figure of our Lord, with an angel on either side. The whole has been very much mutilated, and all the figures hacked to pieces. The ground was all painted, and no doubt the figures were also; and the woodwork of the door was covered with linen or leather under the ironwork.

The very ancient chapel of St. John is close to this door, and by its side is a fifteenth-century archway. The chapel is arcaded on its south side, and pierced with very simple windows. Some antiquaries assert that it is a piece of Roman construction, and it is not impossible, though I should be much more inclined to call it tenth-century work. The chapel has a rude quadripartite vault, and its apsidal chancel is roofed with a semi-dome. It was, until A.D. 1791, the baptistery for the entire city, none of the churches in which seem to have possessed fonts.

I must conclude my already long notice of this church by some mention of the extensive remains of painted decorations still visible. During the late restorations of the cathedral, I understand that the greater portion were destroyed. The north transept vaults, and the semi-domes of its apsidal recesses, are still, however, covered with paintings, though they are scarcely intelligible now, owing to darkness and dirt. In one of them occurs a figure of our Lord, giving the benediction in the Greek fashion, and it is one of many evidences which may be adduced of the Eastern influence visible here in so many respects, though I am not disposed to lay so much stress upon it, as some of those did who engaged in the controversy it occasioned. In the western porch there are also extensive remains of painting. The soffits of the arches in the third bay from the west are all painted; and so, too, are the walls over the altars in the chapels of St. Martin and St. Giles. The painting was executed on a thick coat of plaster, and the nimbi are of gold, with lines incised on them. No doubt the whole church once glittered with gold and colour; and seeing how fine its effect still is, we may, aiding the indications still left with our recollections of St. Mark's, of Assisi, and of Padua, people the bare walls once again, and bring before our eyes an interior of the most gorgeous magnificence.

I may conclude what I have to say about the cathedral, with a few words about the sacristy and its contents. The building itself is not more than 150 years old, and most of its treasures have been lost. The most precious relic still left is the Bible, recorded, by a note at its end, to have been written by S. Theodulf, Bishop of Orleans, in the ninth century, and sent by him, in accomplishment of a vow, to the shrine of Notre Dame du Puy. It is a 4to. of 3,107 leaves of very fine vellum; some white, with black letters, and others, purple or violet, with gold or silver letters. It contains the Old and New Testament, commentaries on the text, interpretations of Hebrew, Greek, and Latin words, and some poems, by Theodulf. The pages are interleaved with excessively delicate tissues of various colours and patterns, which appear to be of the same age as the book, and of Eastern manufacture. The binding is, however, later, and of red velvet on chamfered oak boards, with good simple metal knops. There are also preserved here some wax candles, tapering considerably in their length, and stamped with a pattern made by a pointed instrument; and, finally, there is a tippet, said to have been of Charlemagne's time. It is embroidered with a tree of Jesse. It is not so old as is said, but may *possibly* (though I very much doubt it) be of the twelfth or thirteenth century; but it has been much damaged by removal from its original ground, and by partial reworking. They also have a reliquary of very late sixteenth-century date, of which a photograph has been published by M. Aymard, but which was not shown to me. There is also an almost endless roll of vellum, illuminated with a chronological tree of the history of the world.

How much has been lost may be guessed from some statistics which I have come upon as to the number of silversmiths and specimens of their work in Le Puy in the Middle Ages; in A.D. 1408, there were no less than forty resident in the city; whilst, as to their work, I find that, in A.D. 1444, there were in the sacristy 33 chasses and reliquaries, 26 chalices, 11 statues of the B. V. Mary, angels, and other figures; 10 candelabra, 9 crosses, 9 lamps, 9 mitres, crosses with their stems, episcopal rings, crowns for the Virgin, censers, paxes, basins, plates, books with covers adorned with chasings, pearls, and precious stones; and many like things. And in A.D. 1475, I find that Louis XI. gave thirty silver marks for a canopy over the miracle-working figure of Notre Dame du Puy, which was made by François Gilbert, a silversmith of Le Puy. Other churches in the neighbourhood have been more fortunate in retaining some of their old plate, and a fair list might be made out, if I had time, of their possessions, many of which have been photographed by M. Aymard.

The building of the greatest interest after the cathedral is the little church of St. Michael, which crowns the enormous rock fitly called the Aiguille. It is reached by steps winding irregularly round the rock, to the shape of the summit of which it has been most ingeniously adapted. The oldest portion of the building is the square choir covered with a dome, under which stands the principal altar. To the (ritual) east and north of this are apsidal projections, and to the south an archway, which, as it agrees exactly in dimensions with the others, opened no doubt into a third apsidal chapel like the others, whilst the entrance was at the west. This archway now leads into a chapel of very irregular form, part of which extends over the porch of entrance, in the arrangement of which one may trace a certain kind of analogy to that of the cathedral, though it is perhaps older. West of the choir is a nave, somewhat like a cone in plan, and surrounded on three sides by an aisle, from which it is divided by arches supported on slender shafts. The choir has a square domical vault, and the chapel over the porch a true dome, the pendentives under which are just like those of Santa Fosca at Torcello. The apsidal chapels have semi-domes, and the rest of the church has a waggon vault of very irregular outline. An arcade against the walls of the aisle corresponds with that between the aisle and the nave. At the end of the nave is the tower, which was probably built at a slightly later date than the main building. The whole interior appears to have been richly painted, but a faint indication only of this portion of the decoration remains. In the central dome there is a sitting figure of our Lord on the east side, the emblems of the Evangelists at the angles, and angels and seraphim around our Lord. Below these is a line of single figures, six on each side—the four-and-twenty elders; and below this again, subjects, the whole combining together to make a very interesting example of the treatment of the Last Judgment. The dome of the chapel over the porch is also painted with our Lord, angels, and the Evangelists.

The walls generally are built of lava, though a little white stone is used in the steeple and for the sculptured capitals. The columns are very small (averaging 8 inches in diameter), and decrease considerably in diameter from the base to the capital. The dimensions are exceedingly small, the central choir being only 13 feet 6 inches in diameter, and the spaces between the principal columns varying from 4 feet to 4 feet 9 inches. The effect is rather that of a crypt, but in spite of its small size it is solemn and religious-looking.

The steeple suggests comparison, in some respects, with that of the cathedral; the arches are built with alternately light and dark voussoirs, and there is a peculiar spire-light rising out of the parapet, as to the antiquity of which I have my doubts.

The only part of the building in which any rich work has been introduced is the front of the porch. You will see by my sketch that it has a semicircular arch, trefoiled above a horizontal lintel. The walls are richly inlaid, and there is also a good deal of sculpture. In the centre division of the trefoil is an "Agnus Dei," and figures kneeling and holding chalices within the cusps on either side. In the five divisions of the arcaded cornice are, in the centre, our Lord; on His right, St. Mary and St. John; and on His left, St. Michael and St. Peter. The mosaic is done with black tufa and red and white tiles, and the stone is a light yellow sandstone. I know no other example in this district of the use of tiles for inlaying, though M. Mallay mentions one at Merdogne, in Auvergne, which he says is of the seventh century; but his dates are not always to be implicitly trusted. And at Lyons, in the extremely beautiful Romanesque domestic building called the Manécanterie, and at a slightly later date in the church of Ainay, in the same city, they are freely used, and with admirable effect. Odo de Gissey, in his "History of Le Puy," published in A.D. 1619, states that the first stone of St. Michael was laid in A.D. 965, and that the church was completed in A.D. 984, when Guy II. was bishop of Le Puy, "as one may learn from the antient charter of its foundation, and from other manuscripts which I have read." Brother Théodore, in his "Histoire de l'Eglise Angelique," in A.D. 1693, says that the first stone was laid in August, 962, and that his statements are "derived from the deed for the foundation of the church, and from the book of obits in the cathedral."*

* Quoted by M. Mérimée, "Notes d'un Voyage en Auvergne, A.D. 1838."

These dates, if they refer to the existing building, can only do so to the central portion, with its apses, and the nave may have been added some time in the eleventh century, and the steeple perhaps in the course of the twelfth.

At the foot of the flight of steps which leads up to the picturesque entrance of this little chapel, are the remains of a small detached building, probably a residence for a sacristan or priest.

Close to the foot of the Aiguille de St. Michel is a curious chapel, the plan of which is drawn on the same sheet as that of St. Michael. It is an octagon, with an apse projecting from the eastern face, the octagon covered with an octagonal domical vault, and the apse with a semi-dome. The walls are arcaded inside and out, below the vault, the internal arches springing from engaged shafts in the angles. Some of the arches outside are cusped in the usual way, the cusping not starting from the cap with a quarter circle, but with a half circle, the same as all the rest. There are doors in the west and north sides, with tympana filled in with mosaic; and the wall in the spandrils between the arches outside is also inlaid. The exterior of the apse is not visible, but I found, on making my way into the cottage and barn built against it, that it is perfect and undamaged. The popular opinion at Le Puy is, that this chapel is an ancient temple of Diana, a fiction which a minute's examination destroys. M. Didron, in the "Bulletin du Comité Historique," No. 7, p. 62, maintains that it was a mortuary chapel; this is, he says, a common arrangement in Greece, and he refers to the chapel of St. Croix, at Montmajour, as an example akin to this. M. Mérimée, on the other hand, says that the Templars had property in the Faubourg de l'Aiguille, and compares it to the similar oratory of the Templars at Metz, and he might have added the curious Templars' church at Laon as another case in point.

This concludes my notice of early buildings in Le Puy, and I have no more than time to catalogue the Church of St. Laurence, famous for the monument of the Constable Du Guesclin. It is a large Second-Pointed building, of poor character, and very Italian in its plan and design, and with an enormous sham front; the gable-end of the hospital chapel, with its fifteenth-century bell-turret; a pretty little fountain in the Rue du Portal d'Avignon, and a large number of picturesque houses of the fifteenth and sixteenth centuries; and a very scanty remnant of a gateway at the bottom of the town, called, I think, the Porte Panessac, and against the proposed destruction of which I find M. Aymard protesting, only a few years back, in the Bulletin Monumentale.

About four miles to the north of Le Puy, close to the ruins of the magnificent castle of Polignac, is the Romanesque church of the village. This is parallel-triapsidal in plan, and the piers are planned, as are those in the cathedral, in the shape of a cross, with columns in the re-entering angles.

The little church at Monistrol is a good example of the Le Puy type applied to a very small building, and the church at Monestier, which has many features of similarity to the cathedral at Le Puy, and is rich in early plate, ought not to be forgotten. I am unable to speak of it from personal inspection, but I exhibit a photograph of its west front.

I will now take you to the churches of Auvergne. It seems bold to do so at this period of the evening; but in point of fact, though they are numerous, they are so much alike in their character, details, and design, that a description of their peculiarities need not be so long as might be supposed.

These churches all lie in a group together, Clermont-Ferrand being their geographical centre,* and to its north are Riom, Volvic, Mauzac, and Ennezat; to the east, Chauriat; to the west, Royat and Orcival; and to the south, Issoire and Brioude.

Beyond the bounds of the province, at Conques, at S. Sernin, Toulouse, and in the church of S. Etienne at Nevers, among many others we have examples of precisely the same description of design and construction.

It will be well to describe the general type of these churches, and then give a few notes as to particular examples.

In plan they consist of a nave and aisles, western narthex and steeple, central dome and steeple, transepts with apsidal chapels on the east, and apsidal choirs, with the aisles continued round them, and four or five apsidal chapels round the aisle. Under the choir is sometimes a crypt, in which, in addition to the columns under the columns of the apse, are four shafts, which were intended for the support of the altar, and whose presence certainly seems to suggest that it must have been a baldachin, and not merely an altar, that they were designed to support.

The naves are roofed with waggon-vaults, either with or without cross ribs below them. The aisles have quadripartite vaults, and the triforia above them are roofed with a continuous half-barrel vault, which, as you will see by reference to my sections of Notre Dame du Port, Clermont, resisted the thrust of the vault of the nave; and was, in truth, a continuous flying buttress. The triforia galleries are lighted with small windows, and this, the only light analogous to a clerestory, being entirely inadequate, the effect of the nave roof is generally very gloomy. The transepts are vaulted with barrel-vaults, as the nave, and in one or two instances are divided in height by a sort of tribune, level with the triforium. At Brioude, where this arrangement is seen, there is an original thirteenth-century open fire-place in the tribune, and M. Mérimée ingeniously suggests that the noble counts of Brioude—for they all had the rank of count—were in the habit of hearing mass before a good fire; but it is fair to them to say, that the fire-place is in the east wall, and that I saw no sign of an altar near it.

The crossing under the tower is generally roofed either with an octagonal vault, or with a circular dome, with an opening in the centre. To resist the thrust of this dome on the north and south sides, the upper vaults of the triforia are continued on between the transepts and the crossing. The choirs are vaulted, with waggon vaults terminating with a semi dome, and the apsidal chapels are also each covered with a semi-dome. The columns are generally square, with half columns, engaged on three and sometimes on four sides,—the latter only when the main vault

* The cathedral of Clermont-Ferrand, a fine fourteenth-century church, is said to have been originally on the same plan as Notre Dame du Port. Excavations have proved this to have been the case. The present cathedral is almost precisely similar in plan to those of Narbonne and Limoges.—See Viollet-le-Duc, Dictionnaire, vol. i. p. 74.

of the nave has transverse arches below it. The columns round the apse are circular, and detached shafts against the apse walls carry the groining, and occasionally shafts are introduced inside and outside the window jambs of the choir. In the nave and triforia the windows are generally very plain, with a label containing a billet moulding, though the latter have sometimes, as at Notre Dame du Port and Issoire, jamb shafts.

The capitals of the columns are carved with great richness; sometimes with foliage, but often with Scripture subjects. At St. Nectaire, for instance, perhaps the most elaborate of all these churches in this respect (M. Didron is my authority), the capitals round the apse have subjects from the New Testament, four on each capital. Frequently griffins and other animals are carved, and in one case, at Brioude, is a demon holding an open book, on which is written "Mile-artifex," which does not seem to be a very complimentary arrangement for the sculptor or architect, whichever he was. It is in the earlier examples that sculpture of subjects and figures is commonly seen, and as the style developed more towards Gothic, foliage took the place of subjects. The arcades are remarkable for their generally lofty proportions: they are of course not so lofty as pointed arcades, but they have seldom, if ever, the heavy and low proportion commonly found in the arcades of Romanesque buildings.

The walls were probably covered with painting of Scripture subjects. At Brioude there is some of this decoration remaining in a chapel dedicated to St. Michael, in the gallery over the narthex. I exhibit a slight sketch of this, which represents the "Last Judgment." The semi-domes of the apsidal chapels in the church, were also richly painted, and in one of them traces of colour exist all over the window jambs. At Notre Dame du Port, Clermont, in cleaning the nave, after removing seven or eight coats of whitewash, considerable traces were found of gilding on the capitals; and if this portion of the church was thus highly decorated, there can be no doubt that the colouring of the choir was at least equally sumptuous. The arches are generally semi-circular, and in the apses stilted.

A stone seat is in some cases continued all round the walls of the apse and its chapels, inside and out, and in one or two cases the iron grilles still remain. The only instance of the old pavement that I saw was at Brioude, where it is composed of black and white stone in chequers, but this is a mere fragment, and of poor design.

The entrances to the crypts are by stairs from the transepts or crossing. The staircases to the upper portion of the building are variously placed. At Notre Dame du Port, in the middle of the north end of aisles,—at Brioude, in the transepts, and also at the west end; and in this church an enormous wooden stair leads from the south door up to the chapel of S. Michael, over the narthex. The western steeple, as well as the centre lantern, was sometimes, at any rate, domed; and that at Brioude, of which I have a sketch here, is a most valuable example of the best type of dome in the district.

On the exterior, the designs are as much alike as in the interior. The aisle walls are divided into bays by pilasters, above which arches are turned above the aisle windows; and then above are the windows lighting the triforia, which are generally more richly decorated than those below, and form part of an arcade, with carved capitals and moulded bases. The walls are finished by a boldly-projecting cornice, supported on large corbels. The transepts are buttressed at the angles, have a heavy engaged column in the centre, from which two arches spring, within which are pierced two windows. Above these are other windows, either two or three lights, and the gable is either filled in with mosaic, or pierced with more windows. It is on the exterior of the apse that the main effort at display is made; and the more ornate examples of the style, as Notre Dame du Port, Issoire, and Brioude, are singularly rich in their effect. The photograph of Issoire, and my sketches of Notre Dame du Port and Brioude, will show you their general nature. The two former examples are of very nearly the same date (about A.D. 1080 to A.D. 1130); the latter is considerably later (probably circa A.D. 1200).

I will take Notre Dame du Port first. Here the transept chapels are much lower than those of the chancel; and the latter (four in number, as you will see by the plan) has cornices below the cornices of the aisle, and gable walls are raised on the aisle walls to receive their roof, which would otherwise run back to the clerestory. There are windows between each of the chapels, and a great part of the beauty of the effect, both internally and externally, is to be attributed to this fact. I am not sure that the whole arrangement is not a modification of the original plan; for on close examination I found that the labels of the large windows between the chapels are returned, and mitre with another label, against which the chapels are built, and which might very well have formed part of an arcade, pierced at intervals with windows. In the neighbourhood, about half way between Clermont and Issoire, at St. Saturnin, we have a church precisely similar to what this would have been without its chapels, and the eccentric position of the chapels at Notre Dame du Port, these being never opposite the centre,* would be just such as would have been rendered necessary if it had been desired to add them after the work had progressed somewhat towards completion. In any case, however, there would not have been any great interval in time between them; and probably the chapels and the clerestory are of exactly the same age. The whole of this apse is full of beautiful inlaid patterns, made with red and black scoriæ and white stone. The enrichment is always confined to the walls above the springing of the windows, and does not generally extend quite to the cornice. The spaces between the corbels under the cornice are inlaid, and the under-side of the cornice is carved with a sunk pattern. Between the clerestory windows is precisely the same arrangement of shafts supporting a flat lintel under the cornice that I described to you in the first portion of the clerestory of Le Puy, and here, as there, the recessed wall is all inlaid.

At Issoire, the photograph on the wall will show you that the general scheme is precisely similar. Here, however, a square chapel juts out from the centre of the apse, and the question arises, whether this is an original arrangement. The suggestion I should throw out here, as at Clermont, would be that this is the only original chapel, and that the others were added just as those at that place may have been. In both these churches the buttresses are alternately rectangular and circular, and the latter are always finished with carved capitals. Brioude is an example of a later date, but it adheres closely to the same type, save that there are five apsidal chapels; and though the windows are much more elaborate, having jamb shafts and moulded arches, and being arranged in a regular arcade of triplets in the clerestory, there is much less positive effect of decoration, owing to the comparatively small amount of inlaying.

The churches at Brioude and Issoire are both on a much larger scale, and generally finer than Notre Dame du Port.

Lastly, I come to the steeples of these churches: of these there were one or two at the west end, and one over the crossing. I believe that not one of those over the narthex now remains, though two or three have been recently rebuilt. Those at the crossing were treated in a singular manner. The eastern wall of the transepts, carried up much above the height of the walls of the apse, forms an enormous mass for the support of the steeple, and is arcaded and pierced with windows, or inlaid. The steeples seem generally to have been octagonal, and to have consisted of two stages, arcaded, and sometimes shafted at the angles, and capped with stone spires sloping at an angle of about 60 degrees. The steeple at Issoire is quite modern, and I believe no authority existed for it. That of Notre Dame du Port is also new, the finish having been a bulbous slated erection, with an open lantern at the top only a few years ago. Ancient examples, more or less perfect, still exist at St. Saturnin, Ennezat, Orcival, St. Nectaire, and Huret, and all of these are octagonal.

These churches tally with most other early churches in this feature of central steeples. This is not the time for discussing the question, how far the later French architects were right in so steadily refusing to follow the example thus set them. But we may be well satisfied, as Englishmen, in the opposite course which our architects took; for our greater churches, no doubt, owe no small portion of their dignity and character to the almost constant recurrence of the central steeple.

I have not yet mentioned the roofs. In those which I was able to examine, they are covered with slabs of stone, supported from the stone roofs without any use of timber whatever. The ridges are also of stone elaborately carved, and the whole construction seems to be as imperishable in its scheme as anything I knew of the kind.

If I were to tell you a great deal more about these churches of Auvergne, I should be able to add but little to what I have said: they present so little variety, and were built within so short a space of time, that a description of each of them in succession would be wearisome to a degree. Of course there are some variations. St. Amable, at Riom, for instance, has the main arches pointed, whilst the triforium arcade is round-arched, and the vault of the nave is also pointed instead of round. The vault of the nave of Issoire is another example of a pointed vault. At St. Nectaire, the usual piers in the nave have given way to columns. At Brioude the style reached its perfection, and, indeed, I know few effects more striking in every way than that of the aisles round the choir of which I have a sketch here; the roof, constructed as a regular barrel vault, and without any ribs, seems, to be as true in principle, and to carry the eye on even more agreeably than our ordinary Gothic vaulting of circular aisles, in which the eye is often distracted by numbers of conflicting lines of ribs. The wall arcades between the chapels recal the peculiar form of trefoil to which I have before had to refer, and we meet it again in the triforium of the south side of Notre Dame du Port.

The doorways appear to be of two types,—one enriched with sculpture, the other with inlaid work; of the former the south door of Notre Dame du Port is a fine example. The opening is square, covered with a pediment-like lintel, on which are sculptured in low-relief the Adoration of the Magi, the Presentation in the Temple, and the Baptism of our Lord. Above the lintel is a round arch, under which is a figure of our Lord seated with a seraph on either side; against the wall below the lintel on each side of the door, are figures of Isaiah and St. John Baptist. In the much-altered church at Mauzac,* near Riom, is a door of somewhat similar kind, and both are very like the doorway in the north transept of Le Puy. At St. Nectaire is an example of a door, with a tympanum filled in with mosaic.

The masonry is usually of wrought stones, squared, but not very neatly put together. M. Mallay, the architect, of Clermont, who has restored some of them, ascertained the curious fact that the stonemasons who wrought the stones for arches, and wherever else superior work was required, marked their stones with the usual masons' marks, whilst those who wrought the stones for plain walling, jambs, and quoins, made no mark; and he found that precisely the same masons' marks occurred at Issoire and Notre Dame du Port; whilst the details and plan of Orcival, a few miles south west of Clermont, are again so identical with both of these, as to leave room for little doubt that it was executed by the same workmen; and I found another evidence of the way in which details were repeated in some fine ironwork on the south door of Brioude, which is repeated again at Orcival. The arches are generally built with small stones of the same size, and of even number, so as not to allow of a keystone. M. Mallay says that the mosaic work in the walls of these churches had wide joints of *red* mortar, projecting from the face of the wall. These mortar joints in the restored work, appeared to me to be a bad modern device, and I think that the evidence in their favour ought to be very strong to be convincing.

You will have gathered from what I have said that there are many similar features in the churches of the two provinces which I have been describing. They are shortly these:—Vaults and quasi-domes alike, and carried on the same kind of squinches or pendentives; the decoration with mosaics and its detail; the design and treatment of doors, either sculptured or inlaid; the form of trefoil cusping of arches; character of mouldings; sculpture and decoration with painting; all of these are the same throughout both districts, and the only marked difference—and it is important—is in the ground plan: the Cathedral of Le Puy having no chevet, but an east end, derived from Romanesque rather than Byzantine precedents, and the other churches in its neighbourhood being generally similar in their plan.

I must now, before I conclude, say a few words as to the date of these churches, for which M. Mallay is inclined to claim rather too great an age. He dates most of them (but conjecturally), in the tenth century, though he admits that buildings in which the pointed arch is introduced may be as late as the twelfth century; and, indeed, in a paper by him read before this Institute in A.D. 1839, I find that he considers the date of Notre Dame du Port, Clermont, as circa A.D. 863 to 868. He founds this belief on the fact, that no lava was used in its construction, and that the mosaics in its walls were formed of scoriæ, found on the surface of the soil. He considers that lava was not used until the eleventh century, but he must also prove (which he has not done), that stone was never used in Auvergne after the use of lava had once been admitted. M. Mallay depends, no doubt, to some extent on the admitted date of the nave of St. Amable, at Riom, where the main arches are pointed, in A.D. 1077. But the presence of the pointed arch proves nothing as to date, for we see it long before this in St. Front's, at Perigueux; and in every other respect there is no doubt that St. Amable presents every evidence of being older than Notre Dame du Port, and others of these churches in which none but round arches occur. On either side of Auvergne we have other churches of precisely the same character, as to plan and mode of construction, and of which the dates are pretty certain. One is S. Etienne, at Nevers, which was commenced in A.D. 1063, and completed and consecrated on the 13th December, A.D. 1097. You will see by the plan of this church, that it is similar in nearly every respect to the Auvergne churches. But so far as one may judge of date from style, I should have no hesitation in saying that this church must be older than either Issoire or Notre Dame du Port. It is ruder in character; there is very little sculpture on the capitals, which are mostly a sort of rude imitation of Doric; and in the transepts there are not only round arches, but also some straight sided.

At Conques, south of Auvergne, is another church on the same plan as St. Etienne, Nevers, in almost every respect, which there is little doubt was completed in the first half of the eleventh century by the founder, Abbat Odalric. Then again, to the west, we have the church of Montierneuf, Poitiers, commenced in A.D. 1069, and consecrated in A.D. 1096, which has a chevet evidently formed upon the same type as Conques. And at S. Hilary, in the same city, consecrated in A.D. 1069, whilst the ground-plan of the chevet is just the same as that of Conques, the nave columns are strengthened by a transverse arch, similar in its purpose to a flying buttress, and analogous, therefore, to the half barrel vaults of the triforium in Auvergne. Now, none of these churches are earlier than the beginning of the eleventh century, and yet it is hardly credible that a province shut in as Auvergne is should have received a perfect and complete new style, or invented one, and carried it to the degree of finish and perfection at which it had arrived when Notre Dame du Port was erected, without our being able to trace, somewhere, the source from which it was developed. I believe, however, that its origin may be traced, if we examine carefully the architecture of the church of St. Front, at Perigueux, commenced in A.D. 984, and completed in A.D. 1047. This church, founded on the same type as, if not copied from, St. Mark's, Venice,* exercised a vast direct influence on the architecture of the day, as the map which I have prepared will show. It is seen most clearly in churches which are like itself, cruciform, without aisles, and covered with domes. The churches of Auvergne, and those other examples of the same kind to which I have referred, seem to me to be clearly derived from St. Front's, or from the Eastern models on which it too was founded. The east end of St. Mark's presents us with a circular wall, with a succession of semicircular recesses, or apses, in its thickness. Sta. Sophia contains the same feature, though differently treated. The Roman circular buildings which have so much in common with early Byzantine architecture, have the same feature, and San Vitale, Ravenna,—whether it is Romanesque or Byzantine in its origin,—is planned in a similar way. The architect of St. Front's evidently copied his apse from these models, only converting the recesses of St. Mark's into chapels projecting from the walls. The Auvergne architects attempted to combine the plan of the basilica, with its nave and aisles, with the features which were seen at St. Front's. They retained its external wall and projecting chapels, therefore, but placed within them the cluster of columns round the apse, forming an aisle between the chapels and the choir. By this simple and natural modification of the St. Front plan to meet the necessities of their triple-aisled churches, they at once invented, one may almost say, the perfect French chevet. I know no other churches in France of the same age which appear to have suggested so much in this respect; and you will realize it if you compare their plans with, among others, those of Bourges Cathedral, St. Pierre Bourges, St. Martin Etampes, Chartres Cathedral, the destroyed church of St. Martin at Tours, and finally what is, I think, almost the best complete Gothic plan, that of Rouen Cathedral, in every one of which we see the surrounding aisle lighted by windows between the chapels, and the chapels distinct and well separated on the exterior, precisely as in these older churches in Auvergne. These buildings, therefore, have great value, not only as illustrating a chapter of the history of our art, but because the chapter which they do illustrate is just one of the most interesting we can conceive, being that which explains how and by what steps that Gothic architecture, of which, as our national style, we are so justly proud, was developed from the noble architecture of the old Romans and Greeks; an architecture to which we owe, among other things, this great debt of gratitude, that it naturally led up to, and rendered possible, a Westminster, a Chartres, an Amiens, and all the other glories of our Christian architecture.

I feel that I am trespassing seriously on your patience, but there are still two important heads of my subject to be shortly discussed before I conclude. One of them refers to roofing, the other to coloured decoration. First as to roofing. I have already explained *how* this was executed; let us now consider *why* the modes which we see were adopted. At St. Front's the experiment was tried of covering a nave and transepts with a succession of domes, resting on pendentives, and supported on pointed arches spanning the nave; these domes were the only covering of the church, and were visible on the outside as well as on the inside. At Conques, the architect, unable to carry domes on the comparatively delicate piers, which were all that were required for the division of a nave from its aisles, contrived a barrel vault for his nave, the thrust of which was resisted by the half-barrel vault of the triforium, a device not improbably obtained from Byzantine churches, for if we compare the section of Sta. Sophia with that of the crossing and central dome of Notre Dame du Port, we shall find the semi-domes affording abutments for the great domes in the former absolutely identical in their section with the half-barrel vault which forms the abutment on the north and south sides of the central dome

* S. Hilary, Poitiers, and Angoulême cathedral, have only four chapels.

* At Mauzac is a magnificent shrine of copper enamelled, and at St. Nectaire a variety of precious relics,—crosses, reliquaries, and the like,—of which M. Mérimée has given a list.

* St. Mark's, Venice, was commenced in A.D. 977.

of the latter.* But it was impossible to obtain any light for a clerestory roofed and supported in this fashion; and one is rather disposed to wonder how it was that so many churches should have been built on the same gloomy scheme. It was, no doubt, because in that part of France wooden roofs were thought to be undesirable; and no other economical way was seen of combining the nave and aisles with what was intended to be an indestructible stone roof. I need hardly say that at the same period, in the north of France, in Normandy, and in England, the nave was seldom, if ever, roofed with anything but timber, and the aisles only were vaulted in stone.

At Tournus, on the Soane, another device was adopted to serve the same end as the Auvergne roof, but admitting of a clerestory. This was the covering of the nave with a succession of barrel vaults at right angles to the length of the church, and supported on bold transverse arches. But I doubt whether it was ever repeated on a nave, though there are several examples of aisles thus roofed,† and it was, no doubt, ugly and ungainly. The Le Puy architect devised yet another plan, which combined to some extent all the others, and this was, as I have explained, a succession of domical vaults, which, while it was much lighter and more practicable (owing, in part, to the difference of scale) than the St. Front plan of a series of genuine cupolas, achieved, nevertheless, much of the effect that was there gained. A very small portion only of the weight of the vault exerted a direct lateral thrust, and it was possible, therefore, to erect such a roof upon a clerestory; and though the transverse arches limit the height of the building in one respect, in another there is no question that the height is apparently much increased: for in looking down the interior, it is impossible ever to see the apex of any of the domes, and the vault, lost behind the transverse arches, gains immensely in mystery and infinity, so as to produce the effect of a larger and loftier building than the reality. But, on the other hand, the disadvantages were great: the piers between the nave and its aisles were so large as to render the aisles nearly useless; and I can hardly wonder, therefore, that the example set here was not generally (if, indeed, at all) followed.

It is doubtful where the kind of vault used at Le Puy was first devised. The central dome of St. Michel de l'Aiguille is perhaps the oldest of all, and this is, in fact, a square dome, if one may use the expression. The octagonal dome-vaults of the cathedral are probably a little later; but that over the crossing of the church of Ainay, at Lyons, may possibly be older: if you compare my sketch of it with that of the interior of Le Puy cathedral, you will find that one is evidently copied from the other. And if the Le Puy vault was derived from Lyons, we make the important inference that it was an Eastern influence travelling up the Rhone, and distinct from that which we see at Perigueux, to which we owe this kind of domed roof. You will see further evidence of this if you look at my sketch of the pendentives of the dome at Brioude which are identical in intention with the plan of the church of St. Sergius and Bauhers at Constantinople, and yet quite unlike the kind of pendentive common in churches of the St. Front type. They are, in fact, the Le Puy and Ainay pendentives reduced to the very simplest conditions.

The invention of the flying buttress adumbrated in, and possibly suggested by, the quadrant vaults of Auvergne, finally stopped these various endeavours after new forms of roofs, and set men at work to see how it might most readily be made to serve the boldest and most airy systems of design and construction; and in the rage for these, that old system of roofing with domes, which had been, so far as we know,‡ first tried in France at Perigueux, and had afterwards spread with such rapidity over a very large district—though with many modifications and variations—was entirely ignored or forgotten. Is it well that we, too, should ignore it? It is clear that the disciples of the Gothic school may claim it as their own with just as much truth as any other school can. And in some form or other it is often so attractive—so majestic on a large scale, so impressive even on a small scale—that few of us who have much work to do should altogether eschew all use of it, or treat it as though it were the exclusive property of the architects of Classic and Renaissance buildings.

I do not feel, however, as most who write on the subject seem to do, that our domes must invariably be supported on what are called true pendentives. I think they are not beautiful, and I do not see that they are especially scientific. The St. Front pendentives are mere corbellings out of the wall, and in truth only imitations of pendentives. At St. Mark's they are formed with a succession of arches of brickwork across the angle of the dome, though this construction is not visible; and these, I suppose, are all wrong; but they are very similar in their intention to the kind of pendentive which I have had to illustrate to-night, and which is in truth much more Gothic and picturesque in its character than the true predentive, admits of every amount of decorative sculpture, and is really precisely similar in its object to the squinches under our own English spires.§

I will add but a few words as to the constructional polychrome which distinguishes the exterior of the churches throughout this volcanic district. So far as I have seen, it was never, save in Le Puy cathedral, admitted into the interior; and this is much to be regretted, because it seems that the vaults of their naves, the domes of their crossing, and the semi-domes of their sanctuaries, would have afforded most admirable fields for this kind of decoration. As I have told you, the walls were once covered with painting, and as long as this existed, a mosaic of black and white and dull red would have been valueless; but now that the iconoclast, the whitewasher, and the restorer—all of them at least as active in France as they have ever been in England—have done their worst, the want of some decoration on the otherwise bold surface of the vaults is painfully felt everywhere. Externally, the coloured materials are used in two ways,—sometimes the whole of the wall is built of the dark volcanic products, and patterns are obtained by the occasional use of white stone, or by alternate courses of this and the darkest scoriæ that can be found,—or else the walls generally are built of stone, and the patterns only formed with the dark material. Here, too, as is the case in all old examples of coloured construction with which I have ever met, the colours follow the natural course of the construction. At Le Puy, for instance, the courses are alternately light and dark, producing bold horizontal bands of colour. The arch-stones are continued generally in one line of colour all across an arch, even when it consists of several orders, and from the arch on into the wall. The bands of ornament are similarly arranged in horizontal stripes, generally placed where they will dignify, and give value to some very prominent architectural member. They never occur below the line of the springing of an arcade, and are richest under cornices and between their corbels. And when we consider the date at which this inlaid work was executed, and compare it with what we know of our own art at the same period, or indeed with that of any other portion of the country which we now call France, we cannot too highly extol its delicacy and grace, and its carefulness of design and execution. M. Viollet-le-Duc considers the architects of these churches to have been the ablest of their time. He says, too, which is very true, that they never attempted more than they knew that they could accomplish, and the consequence is, that to this day many of these buildings stand uninjured and undecayed; and all might well have done so, had they received commonly fair treatment at the hands of their guardians. I believe, too, that we may regard the whole of the work in Vélay and Auvergne, as that of native artists. The detail of sculpture is, when compared with such work as is to be found in Provence, exceedingly rude. It is vigorous, indeed, but wanting in that extreme delicacy and refinement, which marks the work of the Early Provençal artists.

It is probable that I have not carried you with me in my theory about the development of the perfect French chevet, from the chevets of Auvergne, for I know how easy it always is to ride one's own hobby. The statement of this theory was, however, only incidental to, and not the main object of my remarks to-night. Originally I intended only to give as good a description of the cathedral and other buildings of Le Puy, as my two days' study of them would allow; and this, because I could not find any published plans or drawings of them, and I thought that the measured plans and sketches which I was able to give you, would, therefore, have more value than would otherwise be the case. I found it impossible, however, to resist saying something of the churches of Auvergne, because they are so mixed one with the other with those of Vélay, that it is difficult to enter fully into one without knowing something of the others also. And it is almost equally difficult to enter upon the examination of churches, such as these, without starting some theories, about which there may be ample differences of opinion among us. Were I to attempt to say anything about the buildings of a later date, it would be impossible to do more than to give a catalogue which would be as unintelligible as it would be tedious. I will only say, therefore, on this head, that Clermont cathedral well deserves careful study, and is rich in very fine glass; that at Montferrand may be seen as large a collection of Mediæval houses of all dates, as in almost any small town that I know; that Riom possesses a fine Sainte Chapelle; and that in the Abbey of Chaise-Dieu are still preserved a very rare and complete series of tapestries of the sixteenth century. Besides this, a large number of articles of church plate are to be found scattered up and down in the village churches; and all this goodly store of antiquities is set before you, in a province whose physical features are so full of interest and beauty, as in themselves to make a journey through Vélay and Auvergne one which none will repent having undertaken.

* Mr. Fergusson gives a section of a church at Granson, on the Lake of Neufchatel, in which the aisles and nave are roofed in the same way as at Conques and in the Auvergne churches. He says that the date of the church is the end of the eighth or beginning of the ninth century, but I do not know what his authority for this very early date is.

† The Abbeye Aux Hommes, Caen, has its aisles roofed with transverse barrel vaults.

‡ This qualification is necessary: for the curious evidence which M. Vermith has given us of the existence of a Venetian colony in the tenth century at Limoges would be enough to make it probable that though St. Front's is the earliest complete example extant of a French domed church, others may have been built before it, and that some of those which M. Vermith supposes to be derived from St. Front's may really have been derived more directly from the East.

§ There is no end to the diversity of the countries in which they are found. In the cathedral at Worms we have squinches formed by semi-domes. In St. Nicodème, at Athens, they are identical with those in St. Etienne, Nevers, and the same form is repeated in the domical vault of the steeple at Auxerre Cathedral. At Notre Dame du Port the dome is circular, but the squinches below are octagonal on plan, and the circle (which is not, however, a true circle) is set up on the octagon.

PURE GAS FOR PRIVATE DWELLINGS.

FINDING, by constant experience, in past years, while originating and exciting the movement in favour of cheap and good gas for the million, that dear gas (then, at all events) was just as bad as cheap gas, and that no price, however high, appeared to be capable of insuring the receipt of gas quite pure, and entirely suitable for use in private dwellings,—such gas, indeed, having been held by the gas authorities to be impracticable,—we therefore ever and anon urged the public to agitate *first* for cheap gas, since they might as well have their gas cheap and bad as dear and bad; assuring them, moreover, that, when they had reduced the till then inordinate and most uncalled for price to reasonable rates, the gas companies,—on whom we were also ever impressing the much greater advantage to themselves of an extended consumption at a low price than that derivable from a restricted consumption at a high rate,—would come to see that an extensive consumption in the vast and almost unlimited field of private dwellings was their most hopeful and best source of profit; and that to insure this they would be compelled to take, or induced to find out, some better means of purifying their cheap gas; without which purification they could not hope to make that field fully their own.

The main objection urged against this view was, as we have said, that gas quite pure and suitable for use in private dwellings was a practical impossibility; inasmuch as gas, generally speaking, after the utmost possible purification, contained compounds of sulphur and carbon which it was utterly impossible to get rid of; except, indeed, in the costly and elaborate or *dilettante* experiments of the chemical laboratory. In this view, too, the gas authorities were strongly supported by the chemists themselves; and, in the evidence taken not long since on the Metropolitan Gas Bill, both gas engineers and chemists united in the one decided opinion that there was no known practical means of depriving gas of this final contamination with bisulphuret (or bisulphide) of carbon and probably other noxious forms of sulphur, after all possible purification had been effected.

Thus, Dr. Letheby, the official chymist of the City corporate authorities, said,—"When *in* the gas, I do not know any means of getting it *out*: it must be prevented from getting in;" and again, "it could not be taken out, but it need not be produced from any quality of coal *except at high heats.*"

But here was, indeed, the difficulty: it is much more costly to manufacture gas at low heats than at high; and gas companies, therefore, had strong temptation towards the application of high heat as well as of cheap and sulphurous coal. Prices, however, had been reduced; at first compulsorily; but, at length, voluntarily; from the acknowledged adoption of our axiom, that extended consumption at low prices was more profitable in the manufacture and sale of gas than restricted consumption at high prices; and, although the companies in almost every instance thus greatly increased their profits,—these, in many cases, rising from zero, or something worse, to 10 per cent., or the highest allowable by law,—still they urged (and probably with truth) that they could not afford to use the costly processes of the chemical laboratory to render their gas really and perfectly suitable for use in the extensive and tempting field of private dwellings, which lay like a rich gold digging before their eyes, but beyond their reach.

Having thus been brought to the very point we had anticipated; the means of removing the noxious bisulphuret of carbon and other pertinacious and noxious compounds of sulphur which defied every available process of purification became a grand desideratum, much more wished for than hoped for, but strenuously sought for notwithstanding; and we, on the public behalf, no less than the gas companies on their own, have ever kept the "weather eye open" to the signs and tokens of its advent. The most hopeful of these signs, in our estimation at least, was the discovery, by the Rev. Mr. Bowditch, B.A., the incumbent of St. Andrew's, Wakefield, that common clay had the curious (but chemically accountable) property of converting the bisulphide of carbon,—which so often remained in the most highly-purified gas, prepared even by low heats, far less in that more cheaply prepared at high heats, and from sulphurous coal,—into sulphuretted hydrogen, which lime and other agents could then readily and cheaply withdraw, as was well known, from the gas. This important discovery was pooh-poohed and ignored by the gas engineers and chemists; one of whom advised that "a cobbler should stick to his last,"—a clergyman to his pulpit; and we ourselves got no little obloquy for defending the rev. gentleman's just pretensions to public and professional consideration. Nevertheless, Mr. Bowditch's process has since been making way amongst the gas companies; and he has now made the additional discovery that lime itself, if heated to a certain moderate degree, acts like the clay, either hot or cold (the hot, apparently, being most efficient), although neither cold lime nor any other known agency in its natural state besides clay will do so. The method adopted by Mr. Bowditch, previous to this additional discovery, in the extraction of the remanent noxious sulphurets from gas, consisted in the repeated alternation of clay and lime (cold lime) in say ten or twelve compartments, through which the gas was made to pass, each clay compartment decomposing so much bisulphuret of carbon, or other sulphur compound, into sulphuretted hydrogen, and each lime compartment absorbing and fixing that sulphuretted hydrogen, till all was extracted and the gas remained perfectly free and pure. The clay, in its use, moreover, had a special power of purifying the gas from ammonia and its compounds; and so valuable is the clay, thus impregnated, said to be as a manure, that agriculturists have supplied gas companies with new clay for the old, as Aladdin's enemy supplied new lamps for the old in order to realize the riches of *his* old material.

The discovery that a small quantity of hot lime

will also convert the sulphurets into sulphuretted hydrogen led Mr. Bowditch to the alternate use, in this case, of hot lime and cold, the hot, or monohydrate, singularly enough, impregnating, as it were, the gas with sulphuretted hydrogen (though from the latter's own sulphurets), while the cold absorbs that sulphuretted hydrogen from the gas. Even hot lime, however, he finds, *if moistened*, will, like the cold, *absorb* the sulphuretted hydrogen so evolved; the reason being that hot and dry lime is a monohydrate, while cold lime, like moistened hot lime, contains a further proportion of water, which deprives the lime of the power which the dry hot lime or monohydrate possesses. Neither hot lime nor hot clay, he finds, at the temperature required, does any injury to the gas itself.

Besides having been brought under the notice of the Royal Society, these processes have been submitted to investigation by various eminent chemists and gas engineers, who all appear to have expressed their unqualified approval of the result.

Thus Dr. Letheby, to whose recent evidence against the very possibility of removing the bisulphuret of carbon, if once allowed to contaminate the gas, we have just alluded, says,—"after having made a large series of investigations for the purpose of ascertaining whether the monohydrate of lime, at certain temperatures, and under certain conditions, would remove every trace of sulphur from coal gas,"—that the results are in the highest degree satisfactory; and he adds,—

"It is needless to dwell on the importance of this discovery; for it is admitted, on all sides, that the presence of sulphur, in an unabsorbable form, is one of the most serious objections to the employment of gas as an illuminating agent; and if, as in the present case, the sulphur can be entirely removed, without in the least degree injuring the illuminating power of the gas, it is manifest that *a new era is commenced in the history of gas illumination*. I have no hesitation in saying, from my investigations of the matter, that *this discovery*, of the perfect action of lime as a purifying agent, *is one of the most important of the present day*, and cannot fail to give an impetus to the manufacture of gas, by securing to the public a complete protection against the hitherto objectionable properties of it."

Dr. Frankland, in "strongly recommending the process to the attention of gas manufacturers," says,—"Unless unforeseen engineering difficulties arise, it will enable them to supply gas in a state of purity hitherto unknown; and thus the only real obstacle to the universal adoption of coal gas for illumination in private houses will be removed.

Mr. Brande, the celebrated chemist, and author of one of the best works on chemistry we have, has also given his attention to the subject, and thus testifies as to it:—

"Inasmuch as all the methods hitherto practised for the purification of coal gas left residuary sulphur in it, in such quantity as to form, in most cases, a mischievous proportion of sulphurous acid during its combustion; and, as Mr. Bowditch's process, when properly conducted, removes the whole of such sulphur, it must, I think, be considered as a valuable and important discovery,—more especially as it is simple, economical, and applicable upon the large scale."

Mr. R. Warrington, chemist to the Apothecaries' Company, who is also chemical referee to all the four gas companies south of the Thames, testifies that he has "investigated the Rev. W. R. Bowditch's new process for purifying gas by means of heated lime," &c., and says,—

"I find that it converts bisulphuret of carbon and other sulphur compounds into sulphuretted hydrogen and carbonic acid, which are easily removable by the processes in daily use at gas-works. The operation is simple and of easy execution. Of course it is needless to add that this renders the use of gas quite free from the usual injurious effects."

Another chemical referee to several London gas companies, Mr. T. W. Keats, F.C.S., considers that Mr. Bowditch has discovered—

"What has been a great desideratum, viz., a practical means whereby coal gas can be deprived of the last traces of sulphur, the presence of which, more than any other circumstance, has prevented the adoption of gas in private dwellings."

The time, then, appears to have at last arrived when we may confidently look for a vast extension of the use of cheap and good gas in private dwellings,—the great and ultimate aim which for years we have laboured to point attention to and to promote the realization of. Meantime, from a small volume on coal gas by Mr. Bowditch, recently published,* we may present the following quotation, because it may be useful to those who would wish to reap the benefit without awaiting the adoption of the means by their gas companies:—

"Consumers can protect themselves against burning ill-purified gas just as easily as they can protect themselves against drinking dirty water. The latter is filtered in a domestic filter, and the former can be as easily purified in a domestic purifier. In fact the trouble in reference to gas is far less than is required for filtration of water. A purifier containing a series of ten or twelve trays of clay and lime would keep back every impurity which can be removed by cold purification, and would last for several months without being touched. Twice a year would be sufficient to renew the purifying material, and the time occupied in doing it would not exceed half an hour. As a precaution, therefore, it would be well if all persons in trade, whose articles are injured by bad gas, and all private persons who burn gas in well-furnished apartments, were to have a private purifier fixed near the meter, which their gas-fitter would cleanse and recharge twice a year for a shilling. They would thus protect themselves against unavoidable accidents which may render impure for a time the gas of the best-managed company, and also against systematic neglect or ignorance."

We might quote passages that would show how much the animus with which this gentleman has been actuated in his researches, accords with our own (although it is to be hoped his efforts will prove a little more profitable and pleasant personally than ours have been), and how fully he adopts the axiom we have for years urged on the attention of gas companies as well as of the public, but we cannot now give more space to the subject. We must add, however, this general observation, that the gas at this moment furnished by some of the companies is of the most unsatisfactory character. That, for example, supplied by the Western Gaslight Company, is so bad at times (we speak from ample personal experience), as to constitute little less than a swindle.

* On Coal Gas; a Discourse delivered to some Directors and Managers of Gasworks, June 13th, 1860, and published at their request. By the Rev. W. R. Bowditch, B.A., Incumbent of St. Andrew's, Wakefield. London: Van Voorst, Paternoster-row.

LECTURES AT THE SOUTH KENSINGTON MUSEUM.

IN reply to a "Reader," who asks "why no lectures are being delivered at the South Kensington Museum," we are told that the following courses of lectures are being delivered in the theatre of the museum, every Monday and Tuesday, in the daytime, by Mr. O. Hudson, on *Ornamental Art*; every Friday evening, by Mr. Marshall, on the *Human Form*; on Monday evenings, from the 7th of January to the 4th of February, on Chemistry, Geology, Physical Geography, Navigation and Nautical Astronomy, and scientific instruction generally, by the various scientific examiners. We can excuse a "Reader" for inquiry, for we believe that the fact that these lectures are going on is very little known. His inquiry referred to the Museum proper, but we may remind him that a course, conducted by the committee of the Architectural Museum, on Wednesday evenings, is easily accessible. The next in this will be delivered January 23rd, "On the Art of Engraving (illustrating the several styles) and Printing Plates," by Mr. S. C. Hall, F.S.A.

PHOTOGRAPHIC SOCIETY'S EXHIBITION, PALL-MALL.

THE eighth Exhibition by the Photographic Society is a good one, and shows as much advancement as can now be looked for year by year. In copying oil pictures improvement is evident, and the process by Paul Pretsch, which includes the production from photographs, by electrotype, of blocks to be printed by the ordinary letter press, an important matter, is progressing. We hear, by the way, of a mode of preparing calico for photographic impressions, which, being dyed with a madder colour, become fast pictures that cannot be washed out. The inventor, Mr. Mercer, further dips calico into a certain kind of cold bath, whereby it undergoes a transformation, somewhat similar to that of paper into parchment, and acquires a stiffness which no heat will afterwards soften.

The great card of the present exhibition is a very large view of the Coliseum in Rome (30), by P. Dovizielli. It appears to have been made in three pieces, and, with marvellous accuracy, brings before the spectator the whole construction of the mighty theatre. The "Aurora," by the same photographer, is already known: it is a fine work. Mudd's landscapes are very good; but the best, as it seemed to us, are those by Maxwell Lyte; notably (153) "Pie du Midi d'Ossau," and (515) "View from the Coumelie." Amongst the landscapes we may mention also (279), "Panorama of Raglan Castle," by F. C. Earl. Fenton has some remarkable studies of fruit and flowers, 148 and 150. "The Tomb of Bishop Fox, Winchester (234), by Cundall and Downes, is a nice specimen, and (266) "Copy of Engraving after Murillo," by H. Hering, shows the power of photography in this path. No. 4 in the series, 252, showing the statue of Newton, by Munro, presented by the Queen to the Oxford Museum, and photographed —on waxed paper—by S. Thompson, is very attractive. It is a most graceful thing; thoughtful and calm in the pose of the figure; and it is admirably reproduced. Captain H. Dixon's views of buildings in India, 399 to 410, have an interest of their own. F. Bedford maintains his position, whether in landscape, "Cheddar Cliffs," or in buildings, as 482, "The Vestibule of Bristol Chapter House," and his views of Wells Cathedral. The appearance of the exhibition owes much to the care of Dr. Diamond, the present estimable secretary of the Society.

TAYLOR'S DAMP-PROOF COURSE.

THE "damp-proof course," as it is called, consists of a perforated slab of burnt clay, bedded in mortar, in lieu of asphalte, sheet-lead, or slates in cement, the joints being brought together dry. Mr. George Jennings, who has purchased the patent, urges for it that it keeps down the damp; admits, in a much more complete manner than air bricks, of the introduction of air; and bonds the walls with an imperishable material of great strength. It seems to us to have claims on the attention of those who would build properly: the extra cost, moreover, is inconsiderable.

THE ARCHITECTURAL EXAMINATION QUESTION.

PROCEEDINGS OF THE INSTITUTE OF ARCHITECTS.

A SPECIAL general meeting of the Institute was held on Monday, the 14th instant, to consider this question; Mr. M. D. Wyatt, V.P., in the chair. We proceed to give the result, and may hereafter report the debate.

Mr. Hayter Lewis, honorary secretary, read the replies received from those societies to whom inquiry on the part of the Institute had been addressed, viz., from the Northern Architectural Association, the Birmingham Architectural Society, the Liverpool Architectural and Archæological Society (with a protest from the associates and students of the same society), and the Architectural Association (of London).

The Institute had resolved on the 25th of June last,—

"That it is desirable to afford an opportunity for a voluntary professional examination."

A motion from the chair on the part of the Council, and hereunder given, as modified, was withdrawn to allow of the following preliminary resolution, which, on the motion of Mr. J. W. Papworth, seconded by Mr. Kerr, was carried:—

"That this Institute by the publication of the resolution of the 25th June, 1860, and by the circulation of the propositions submitted by the Council at that time, having, to the utmost of its power, ascertained the views of the profession thereon, and having taken into consideration the replies forwarded by the various societies, does, in conformity with the wishes expressed in these communications, take upon itself the labour of constituting an examination tending to promote a systematic professional education."

The following motion from the chair, seconded by Mr. Godwin, already referred to, and as amended by the suggestions of Mr. Jennings and Mr. Papworth, was carried; an amendment for an adjournment having been previously negatived:—

"That the examination be open to any British subject; and that candidates, not members of the Royal Institute of British Architects, do produce a recommendation, signed by three members of the Institute (one of them being a Fellow), and subscribe a declaration of their intention to practise, as architects, in accordance with the usual rules of the Institute."

An amendment, proposed by Mr. Street, and seconded by Mr. Pearson, to substitute the words "any person" for "British subject," was negatived.

It was moved from the chair, and seconded by Mr. Penrose,—

"That the council be empowered to carry the said resolution into execution, and be requested to appoint a committee to act in conjunction with them."

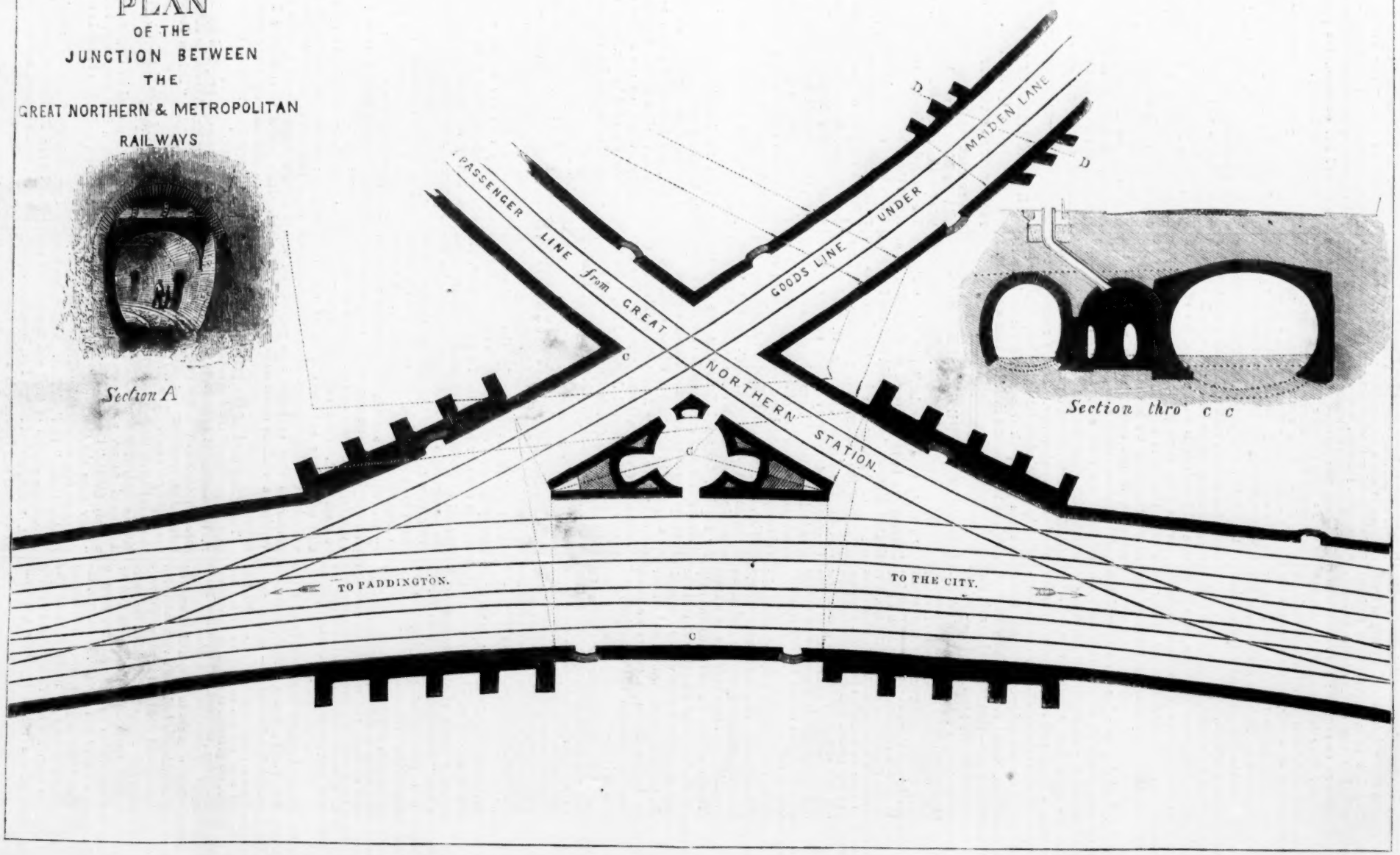
Upon this the following amendment was proposed by Mr. R. Kerr, seconded by Mr. Burges, accepted by the council, and carried unanimously:

"That the council be instructed to proceed with the preparation of a curriculum and bye-laws, and be recommended to appoint a committee to this end to report to a general meeting."

A vote of thanks to the chairman closed the proceedings.

PLAN
OF THE
JUNCTION BETWEEN
THE
GREAT NORTHERN & METROPOLITAN
RAILWAYS

Section A



Section thro' c c

Section at **A** *shews the Iron Tubing for Carrying the Fleet River.* **C.** *Telegraph Room.* **DD.** *The Fleet River crosses here.*

METROPOLITAN RAILWAY. THE JUNCTION AT KING'S CROSS.*——MR. JOHN FOWLER, ARCHITECT.

[* See p. 33, *ante*.

THE LEEDS MECHANICS' INSTITUTION COMPETITION.

WE have received a long letter from the secretary of the Leeds Mechanics' Institution, with reference to the criticism which appeared in the *Builder*, on the plans in competition for the new building of the Mechanics' Institution and School of Art. Out of consideration for that gentleman, and the apparent haste which characterizes the composition, we forbear to print it. As fallible beings we are at all times liable to err, and are only too happy to rectify any proved mistakes; but we suggest to the secretary that to write an abusive letter is not the best way to point out assumed errors.

The first fact noticed in the communication is the statement we made concerning the issue of a second circular, giving architects permission to amalgamate the departments of the Institution. We observed that this circular entirely altered the conditions of the first; seeing that, whereas, in the first, the two departments of the Institute were to be kept separate, so that the whole might be built at two separate dates, the second gave permission to transpose rooms in such a manner, that the whole Institution would have to be built at one time. We stated that this latter circular was apparently sent too late for the authors of what we considered the best plans to make use of this permission. The secretary writes:—

"The first instructions were issued on the 28th of June last, and stated that a plan of the site, with full printed particulars, might be obtained on application to the secretary. Considerable delay took place in getting out this plan. Copies were not ready for delivery till the 8th of August, *and the time for sending in designs, originally fixed for September 20th, was, in consequence of this delay, extended to October 20th.*" (The italicizing is ours.) "Frequent complaints were received from architects, urging the importance of being furnished with ground-plan: stating, naturally enough, that not a pen could be put to paper until they had it. Now, the majority of the architects did not receive the plan till the *middle of August*, and some as late as the 27th; and the circular, which is the bone of contention between us, was issued on the *30th August*, viz., within ten days after the architects would receive the ground-plan, &c., and seven weeks before the plans had to be sent in. You say, 'thus we find that, in the best plans, the original instructions are observed strictly: curiously, however, the permission was used in the selected plan.' In reply to this we may observe that a great majority of the competitors had used the same permission."

It will be seen, then, that copies of the plan (the site) were ready for delivery by the 8th of August, and may have been delivered at once to some, the majority of competitors not receiving the plan "till the middle of August"—the 15th; "and the circular, which is the bone of contention between us, was issued on the 30th day of August, viz., within ten days [fifteen days, if you please, Mr. Secretary] after the architects would receive the ground-plan, &c., and *seven weeks before the plans had to be sent in.*"

Now, we will suppose the majority of competitors to have received the plan, with the information that the time was extended to October 20, by the 8th up to the 15th of August: the great difficulty of the plan was to keep the two departments separate, and this condition was never abrogated. In the first week in September the competitors receive the second circular, stating that, in "case of any difficulty of providing for the School of Art rooms, some of them might be placed in the Mechanics' Institution wing." But this was to be only done in case of a difficulty; and, as the majority did not do so, they apparently found no difficulty in complying with the condition. Moreover, by this time, when the competitors had been working for nearly a month (from August 8 to the first week in September) on their plans, it was impossible in the remaining time to entirely rearrange their designs, and most of them did not do so. We augured that it was because this second circular was sent too late to be of use to them, and we adhere to that opinion. The secretary states that the majority *did* make use of the permission to amalgamate the departments. This is surely a misrepresentation. The majority of competitors did not do so, and the following among the number,—"Prodesse civibus," which was the second selected plan; "Spes," the third selected plan; "Art and Science;" "Austos" (a design not noticed by us); "Fortiter et Fideliter;" and "Red Cross in a Circle,"—all of whom adhered to the original conditions, and made designs which could be built in two sections. In fact, it must have been a question with the architects when they received the second circular whether they should entirely recommence their works, or elaborate their designs as they then stood. As there was not time left for the former, they appear to have resorted to the latter. They comply with the minor features of the circular, but adhere also to the original conditions. Thus we considered ourselves justified in remarking that the circular was sent too late to be of use to the majority, from the fact, which the secretary does not seem to be aware of, that, in the best plans, "the original conditions were observed strictly."

With reference to the question of estimate, on which we do not desire just now to lay much stress, the letter proceeds,—

"Condition No. 6, says,—'The author of the design that may be approved will afterwards be required to produce competing estimates for the several works from approved parties; and should the lowest amount of the total of these estimates exceed the sum of 13,000*l.* *or thereabouts*, the plan will be rejected.' Some architects, 'taking advantage of the words "or thereabouts," exceeded the amount by 500*l.*, 1,000*l.*, and 1,500*l.*; and *if* the committee determined to give them all a place in the competition, little fault can be found with one who exceeds the estimate by some 200*l.* or 250*l.*'"

If the committee swallowed its own instructions by considering plans which exceeded the estimate by 1,500*l.*, it certainly had a right to digest also this excess of 250*l.*,—but this is a bad way of putting the argument. As the secretary puts it, it stands thus:—"If the committee chose to do a great wrong, it had a right to do a lesser wrong." We object to both the greater and the lesser.

After quoting the instructions to competitors, the secretary says,—

"The committee stipulates only for the area required to accommodate the pupils."

This was a mistake: the committee not only stipulated for the area, but gave, room by room and foot by foot, the dimensions of most of the rooms. The secretary proceeds,—

'Any man of common sense might have gathered, from the general spirit of the instructions, that the conditions were imposed more as suggestions to guide him, than as laws, the infringement of which would expose the offender to instant expulsion. This strict adherence to printed instructions, which is so strenuously advocated, and insisted upon, if strictly carried out, would, in nine cases out of ten, destroy all originality of conception on the part of the architect."

Our answer to this is a requotation from the printed conditions:—"*Any breach of these conditions will certainly exclude the drawings.*"

The secretary adds,—

"Instructions should only be regarded as a help to competitors; and he is the wisest who embodies so much as is compatible with beauty of design and simplicity of arrangement, and who has the genius to conceive what may be but badly expressed in the conditions, and who has the promptitude to execute it, and who throws the rest, which would only encumber him, to the winds."

This is rather a different tale to that told in the statement,—"Any breach of these conditions will certainly exclude the drawings."

Conditions are either intended to lead or mislead. The committee evidently intended they should be complied with, or they would not have made the above threat of exclusion for non-compliance. Our readers know very well what our opinion is of stringent conditions; but, if conditions be issued, those issuing them are bound to select those competitors who have attended to them.

Taking us to task for presuming to differ from the committee in the selection of what we considered the best plans, the secretary states:—

"In your criticism of the Gothic plan marked 'Red Cross in a Circle' (Mr. Crossland's) you state, amongst the advantages which give it the pre-eminence, in your opinion, is the following:—That the 'central court-yard in the Gothic plan is most valuable as a means of access for carts and goods.' We should like to know wherein this value consists, seeing that the said court-yard has no communication whatever with the street!"

This is a specimen of the amount of knowledge betrayed by the judges, if the secretary fairly represents the committee's knowledge. We are confidently assured that the central court-yard *does* communicate with the street by means of an archway at the side. The letter concludes:—

"We may, in conclusion, observe that the plans have not been submitted to Mr. Scott. The impression which yourself and Mr. Crossland seem to have is, that the plans were to be submitted to Mr. Scott for his opinion on their respective merits. The committee had no such intention. The prize design has been selected without any professional assistance whatever."

We have only to say, in reply to this, that the committee, we are positively assured, so far from not having any intention of submitting the selected designs to Mr. Scott, *did* decide to submit them to Mr. Scott, and that the secretary came to London for that purpose; although Mr. Scott did not see the designs.

In conclusion we have only to remark that, when a "prize design is in future to be selected without any professional assistance whatever," competitors will do well to know who *are* the judges before they enter into competition. Both Mr. Crossland and Mr. Garling concur with us in our opinion that, intentionally or otherwise, an injustice has been done to them, as their letters in our two last numbers plainly show.

APPEARANCE OF LONDON:—DISAPPOINTMENT OF VISITORS.

IN nine cases out of ten, the first idea of persons coming from the provinces to the metropolis is one of disappointment and bewilderment. In the cathedral cities of the empire, and elsewhere, there are stately and beautiful buildings, which have in a degree formed a standard of taste, by which a judgment of other structures is, in some measure guided; and now, in most of our chief towns, we have halls and other institutions raised on a large scale, and which claim general admiration for their architectural merits.

Let us take for instance, Edinburgh. Glance at the churches and other places of worship which have been reared in modern times. See that classic temple for the fine arts—that fine monument to Sir Walter Scott,—the buildings which have been reared for business and other purposes,—the massive stone-work,—the open squares,—wide streets and other excellent arrangements of the new town,—and the picturesque but unsanitary appearance of the old: we will say nothing about the buildings on Calton-hill. There is, however, enough in Edinburgh to make those acquainted with that place, rather criticising in their judgment on other towns.

So great has of late years been the increase of our large towns,—that a vast amount of bustle is no rarity; and in some of our chief commercial and manufacturing places, such as Manchester, Liverpool, Glasgow, Birmingham, &c., scenes of as great activity may be witnessed, as will be met with in any part of the metropolis. They who come to London from the Mersey, Tyne, and other famed trading rivers, have recollections of the great docks and other arrangements for shipping and such like useful purposes; and it is a singular, but true circumstance, that most of those who come for the first time from the provinces to the metropolis are apt to have an idea that those spots connected with incidents with which they have been long intimately associated, are larger than they are in reality, and look upon what meets the eye in London, with comparative indifference. Many will remember, however, when, after a few years' acquaintance with the great capital, they have returned to the scenes of their youth,—how dwarfed and circumscribed seemed those places of which they had carried away such great ideas.

Doubtless, one of the causes of the disappointment at first by the visitor to London, is the unfavourable points at which travellers arrive. In the old stage-coaching days, the places for setting down,—the White Horse, Fetter-lane; the Saracen's Head, Holborn; some of the old-fashioned holsteries in Bishopsgate, &c.,—were places of the most ordinary description, and not surrounded by anything of a stately or striking description: since the building of the General Post-office, the Bull and Mouth, in St. Martin's-le-Grand, might be considered as an exception. In the present era the railway termini are most unfortunately situated. What can be more dilapidated and dismal, than the scenes which meet the eye on arriving from the east? Is it possible to produce throughout the whole kingdom, a more incongruous mass of buildings than the terminus at London-bridge, the entrance to London, for persons coming from abroad? In the Waterloo-road approach, there are seen before leaving the train, seemingly endless masses of dwarfed, unwholesome, and ill-built houses, exhibiting dismal scenes of poverty; and when the station has been left, in all directions there are rows of monotonous houses.

A singular impression is made upon the country visitor, when first wandering along such thoroughfares as the Strand and Fleet-street, in noting the numerous well-known names which meet his eye;—the newspaper offices, the publishing houses of well-known serials, and other literary works; the places which have been made familiar throughout the length and breadth of the land by persevering advertisers; the famous banks, &c.; and he wonders at the small and insignificant appearance presented externally by many such places.

Left, even after some days of friendly guidance, in the streets of London, the feeling of bewilderment is extreme, for as boundless in a certain sense seem the masses of houses, lines upon lines of streets, as in another light must the wide-spreading prairies of America to the unaccustomed traveller. Building after building is passed, in the first instance, without particular notice; and yet, perhaps, one of these would present a striking feature in most provincial towns. Day after day, by means of knowledge, this mighty city impresses itself by its vastness on the mind. Here, without any particular external appearance, is a manu-

factory in which are between 2,000 and 3,000 workmen. There, in the General Post-office, many thousands of persons are busily engaged. Almost adjoining it, St. Paul's Cathedral stands about four hundred feet in height; but grand as it is, it does not look out of keeping with the objects around. On first looking at the metropolis we see structures such as the East-India House, the National Gallery, British Museum, and General Post-office, and some other places which, in their general features, are not unlike, and convey an idea of monotony; and, when compared with Edinburgh, Dublin, or even the new parts of Newcastle-upon-Tyne, it must be felt that a sad want of that effect which is caused by general arrangements exists in London. One quarter of the money which has been lavished here and there, if some decided plan had been adopted by an architect like Inigo Jones or Sir Christopher Wren, would, notwithstanding the comparatively bad site of the city, have led to better results.

Much, however, depends on the season of the year at which the visitor reaches the metropolis. In summer, when the parks and squares are green, and bright with flowers, and when the fashionable and pleasure end of the town is gay with people and carriages, and the streets enlivened outside by the house-painter, the contrast with most of the manufacturing towns is very striking. The dazzling shops at night, the works of art and curiosity in galleries, and thousands of other things which attract attention, are, as we have said, bewildering to visitors, and they are even more wonderful to those who have studied them for many years. AN ARTIST.

CREEKE'S CAPPED DRAIN-PIPES.

SOME people are afraid of spiders and "daddys," some of ghosts: one is horrified if he meet a squinting woman, and another can't abear Friday. Our own especial object of dread,—shall we acknowledge the weakness?—our own *bête noire*,—is nothing more nor less than—a drain-pipe! When one of fresh shape is brought to us, we know what will come of mentioning it, and view it with quaking and dread. Speak of A., and B. feels injured: mention Poole, and Lambeth is fluttered.

However, we must keep our readers informed; and we therefore point attention to the arrangement of drain-pipes patented by Mr. Creeke, the characteristic of which is a cap at every other joint for inspection or cleansing. An illustration of it has appeared in our advertising columns. Amongst other good qualities the patentee claims, that the capacity of the drain is not lessened when under examination; the side joints above the ordinary water level having a free drainage course for seven-eighths of the depths of their diameters to the water line of the cap, which is secured by a flange; consequently, there is no liability of leakage; and, moreover, that they can be supplied at the same price as the ordinary socket-pipe.

SEWERS AND SEWAGE.

THE flow of water in sewers and drains must vary in accordance with the amount of permanent spring water found on the line of any sewers and drains. In ordinary weather the springs, day by day, will give steady volumes of water, which will, however, vary with the seasons and time of such seasons. The flow of rain-water will be exceptional. With a regular and steady flow of spring water there will be a daily intermittent and varying flow of sewage; regulated, of course, as water is used for domestic purposes. Commencing at 6 o'clock A.M., there is a gradual increase up to 8 o'clock and then up to 11 o'clock. From this time the flow slackens to culminate again about 4 o'clock, P.M.; diminishing to 8 o'clock, from which time to 6 o'clock in the morning spring water alone, or almost so, is flowing. In devising pumping-works it is very important to ascertain the irregularities; and, in using sewage for irrigation, the condition of the fluid at stated periods should also be observed. From 8 to 11 o'clock in the morning sewage will, we expect, be found to be the richest in manuring power, and then up to 6 o'clock P.M. During the night spring water almost pure is flowing to the outlet.

The relative volume of spring water to sewage water will vary, probably, in each town.

The amount of sediment brought down by sewers will depend on the surface gradients, character of roads and streets, surface cleansing, &c. The cubic volume of sediment to be dealt with will, however, startle some engineers new to their work; and, in surface irrigation, will bother the farmer, unless it is allowed to subside before the fluid is turned on the land. At Birmingham the ordinary quantity is, we have learned, some 500 cubic yards per week; or, upwards of 25,000 cubic yards per annum, of solids to be removed by hand. A week of heavy rain has brought down something like 3,500 cubic yards in one week. This is road drift and solids which deposit in the subsiding tanks, and are now removed regularly at great cost to the corporation.

Experience has proved that sewers may be so constructed and used as to remove the ordinary solids with the fluid, even on gradients so low as 1 in 700. This is a great gain over wide and flat inverts, which inevitably retained all the solids to be removed by hand labour, or ultimately to choke up the sewer. It is much better and cheaper to remove the solids at the outlet than from the sewers. Besides, clean working sewers are free from putrescible matter, which sewers of deposit are not. We shall be glad to publish any useful *facts* relative to sewers and sewage if sent to us.

THE ARCHITECTURAL ASSOCIATION.

THE ordinary meeting of members was held on Friday evening, the 4th instant, at the house in Conduit-street; Mr. T. Roger Smith in the chair.

The minutes of the last meeting having been read and confirmed,

Mr. Billings gave a sketch of his professional career, and exhibited a number of drawings illustrative of works carried out under his inspection. In the course of his observations, referring to polychromy, he remarked, that in his opinion it was quite inappropriate to a climate like ours, subject to vicissitudes of intense cold, and the chemical action of the atmosphere. He did not deny that the principle of polychromy might be advantageously carried out for internal decorations, but he contended that the experiments made in various public buildings in the metropolis were sufficient to prove that it could not be successfully applied to exteriors. The attempts made to gild the iron railing in front of the British Museum and the cross at the top of St. Paul's, were, he submitted, abundant evidence that this process was unsuitable to the climate of England. The speaker concluded his observations by recommending young architects not to supply designs for works which they were not to carry out, as he stated that he had himself suffered in reputation by the "subsidence" of certain works carried out by the late Lord Murray, at Edinburgh, and the failure of which had been caused by an oversight on the part of the person entrusted with the superintendence of the work, and for which he (the speaker) was in no wise responsible. The speaker complained, in reckless phraseology, and without the slightest ground, of a notice of this accident that appeared in the *Builder* of March 10th, 1860. The paragraph, which came to us just as it was printed, attributed blame to no one; did not seek to do so; indeed, mentioned no name; and our belief is that until this moment we had never heard that he had anything to do with it.

The Chairman announced that on the next evening of meeting (the 18th instant) Mr. Arthur Allom would read a paper on "The Battle of the Styles."

The subject for the class of design was "A Town Gateway."

CONDITION OF OUR TOWNS: BRIDGWATER.

THE editor of the *Bridgwater Times* says,—

"Our very useful and clever contemporary, the *Builder*, commences the new year with a subject of great domestic importance,—'The Condition of our Towns'—which it proposes to review from time to time during the current year. It says, 'all admit how useful it would be in most of our daily concerns to be able to see with other people's eyes!—whence we may conclude that, if the inhabitants of various towns could be brought to see, with a stranger's eye, the vital need of immediate attention to the existing ills, there would be little time lost before the necessary remedies were set in motion.' This is very true; and the impartial and scrutinising eyes of the *Builder* will detect, in most of the towns he visits, more or less neglect of the common sanitary conditions under which alone a dense population can remain in a normal state of health."

After giving an account of one of our articles the *Bridgwater Times* goes on to say,—

"The agitation of this question calls us to look at home. With reference to drainage Bridgwater has nothing to complain of: the natural advantages she possesses have been taken advantage of by the local authorities; and we may safely assert that there are few better drained towns in England.

"There are a few courts and alleys and cottages which would be better pulled down; but, generally speaking, there is no deficiency of fresh air in the poorer parts of the town. In sanitary matters, then, we have no great cause of complaint; but, when we advance from them to town improvements, there is something to be said. The town at present is in a ferment with reference to the site of the post-office."

And the editor then proceeds to urge the desirability of several much needed new buildings. Is our intelligent contemporary quite certain he is correct in saying that, with reference to sanitary matter, there is little to complain of in Bridgwater? We have an impression that, if he were to look, with knowledge, not merely at the courts, but into some of the houses in better parts of the town,—into some of the cottages in the neighbourhood,—even into the *workhouse*,—there would be a different story to tell.

Perhaps he will try.

PROVINCIAL NEWS.

Norfolk.—At the Norfolk sessions the county surveyor reported to the police committee that the repairs of the Acle station (the roof of which had been in a very bad condition) had been completed. The flat roofs of the Grimstone, Holt, Reepham, and Stalham stations, the committee recommended should be replaced by slated timber roofs in the ensuing spring, at a cost not exceeding £400. Mr. Howes observed that all the flat roofs put up by the late county surveyor had entirely failed, except the one at Norwich, which hitherto appeared to have answered. The repairs were ordered to be made.

Wilsthorpe.—The *Lincolnshire Chronicle* gives the following list of tenders for a new farm-house, farm premises, and pair of double cottages, including all fencing and fittings, and labour and materials, for Mr. Arthur English, proposed to be built at Wilsthorpe: E. Pearson, London, 2,446*l.*; S. & W. Pattinson, Ruskington, 1,605*l.*; Swann & Carrington, Market Deeping, 1,526*l.*; J. W. Timms, Castle Bytham, 1,459*l.* 5s.; H. Bradshaw, Stamford, 1,420*l.*; Belton & Grant, Metheringham, 1,276*l.*; Cogswell & Day, Peterborough, 1,252*l.* 9s.; J. & J. Sneath, Baston, 1,250*l.* 18s. 10d.—Architect, Mr. E. Browning, Stamford.

Uxbridge.—The new Corn Exchange over the old Market House has been opened. The old roof has been removed, and a lantern-trussed roof substituted. There are new side-windows and a new floor, and the centre ceiling is coved. The room is 109 feet long and 25 feet wide, and there are three private offices at the east end, and a committee-room at the west end. There is room for about thirty stalls. The architects were Mr. Eves, of Uxbridge, and Mr. Shoppee, of London; and the builders, Messrs. Fassnidge & Son, of Uxbridge.

Reading.—Of the New County Assize Courts and Central Police Station, the local *Mercury* says,—It had been expected that the entire building would have been completed ere this, but, as might be anticipated, the late strike amongst the building operatives occasioned much delay and inconvenience to Mr. Myers, of London, the contractor. The new buildings, however, have been prepared for the Epiphany Sessions, which have just been held in them. The principal apartments, besides the building erected for the Berks Constabulary Central Station, are,—an entrance-hall, communicating with the Crown and Nisi Prius Courts, and with the Finance Committee and Treasurer's room; Clerk of Indictments' room; Grand Jury room, communicating with Grand Jury gallery and with the gallery for witnesses in waiting; Grand Jury retiring room; waiting room for female witnesses; rooms for Petty Juries, Counsellors' consulting room for each court; Barristers' robing room and lavatories; offices for Clerk of Peace. In the basement are refreshment rooms. The arrangements as regards hearing in the Court, are said to be satisfactory.

Guildford.—It has been determined to erect a new public hall here, with a lecture-room for 1,000 persons, and accommodation for the Guildford Institute and Workmen's Institute. The estimated cost of the building is 2,500*l.*

Southampton.—There is some prospect of a new lunatic asylum being required for the town of Southampton.

Chipping-Norton.—New National Schools, built at a cost of 1,500*l.*, have been recently opened here. The buildings were erected by Mr. C. Young, builder, of this town, under Mr. W. Wilkinson, architect.

Kelso.—It is the intention of the Commissioners of Supply to commence the erection of a new Court-house here as soon as the preliminary arrangements can be made, and the weather will permit; and Mr. Rhind, of Edinburgh, has been appointed architect.

Dundee.—The tender of Messrs. George Hag-

gart and William Robertson, builders, Dundee, for the erection of the new Post Office has been accepted. It amounts to £3,665. The Parliamentary grant was £4,800, of which £575 have been paid for the site, and the balance will be expended in furnishing, &c.

CHURCH-BUILDING NEWS.

Great Carlton (near Louth).—The church of St. John the Baptist, Great Carlton, which has been (with the exception of the tower) entirely rebuilt, almost at the sole expense of the vicar (the Rev. Frederick Pretyman), has been re-dedicated to the service of the church. The restorations have been carried out from the designs and under the superintendence of Mr. John Fowler, architect, Louth. The old arcades have been rebuilt, and heightened below, so as to correct the previous shortness of these pillars. The nave roof is of a simple constructional form, and the south aisle has a lean-to roof; but variety is given to the fabric by covering the northern one with a span roof, in consequence of its greater width. An arch opens into the chancel, and this last is finished with a reredos enriched with Minton's wall tiles, in which green predominates beneath the east window. In the interior of the walls the warm but sober hues of the sandstone from the old fabric have been contrasted with the freestone pillars and arches below, while above lines or strata of the rose-coloured brick of the vicinity are diversified with bands of Ancaster stone, narrow borders of blue tiles, and others lettered. The monotony of this horizontal linear treatment is diversified by occasional figures formed of tiles of various hues and white bricks. Externally, a small octangular vestry is surmounted by a conical roof.

Bicester.—The restoration of Bicester Church is contemplated. It is proposed to remove the galleries, throw the vestry-room open to the body of the edifice, remove the present pews, and re-seat the church with open seats. The cost is estimated at 2,000*l.*

Maidstone.—On St. John's day, the church of St. John, which is situate in the Mote-park, the seat of the Earl of Romney, was consecrated by the Archbishop of Canterbury. It consists of nave, chancel, vestry, organ-chamber, north porch, and bell-turret at west end for three bells. The style of architecture adopted is Early English, slightly approaching the decorated period; and the principal materials employed in its construction are Kentish rag-stone for the outer walls, with dressings of Bath stone; the interior face of the walls being entirely of fair hassock in regular courses, relieved by dressings of Bath stone. The roofs are open-timbered, that to the nave having six pair of curved principals with traceried spandrils, and that to the chancel being groined throughout. The curved ribs, both in the nave and chancel, spring from stone columns with carved capitals and bases; and the whole surface of roof is simply varnished, the principals and carved ribs alone being stained. The windows of the nave are glazed with amber-tinted glass, and fitted with patent ventilators instead of the ordinary opening casements; and the chancel windows are filled with polished plate-glass. The floors are laid with Maws' encaustic tiles. The seats are arranged to give accommodation for upwards of 200 people. The architect was Mr. Henry Blandford, of Maidstone.

Winchester.—Christchurch district-church has been consecrated by the Bishop of Winchester. The architect was Mr. Christian, of London; the contractor, Mr. Bull, of Southampton. The cost of erection has been 3,500*l.*; and of this sum Canon Carus contributed 2,000*l.*, the remainder having been raised by public subscription. The materials used are Kentish rag-stone, with Bath-stone dressings. The church is composed of a nave, 56 feet long by 28 feet wide, with two side aisles, each 56 feet by 14 feet; and of a chancel, 28 feet by 25 feet, with an aisle for children in its north side, and a vestry situate in the base of the tower on the south side. The height from floor of nave to the underside of the ridge of roof is 51 feet. The height from chancel floor to roof is 44 feet, while the height from the floor to the apex of chancel arch is 34 feet 6 inches. The height of tower from the ground to the base of spire, to which point only has it been carried (the funds being wanted to complete the spire), is 55 feet. The spire is intended to be carried up to an altitude of 55 feet also, and is to be furnished with a vane of 7 feet in length, making the entire height from the ground 117 feet. The chancel terminates in an apse of seven sides. The plan of the nave, with its north and south aisles, covers a square of the dimension of 56 feet by 56 feet, or four squares, each 28 feet by 28 feet. The plan of the chancel is also based on a square of 28 feet, so that the length of the nave is twice its own width, and the total length of the church, including nave and chancel, is three times the width of the nave, or 84 feet, the width being 56 feet. The foundation of the church is a bed of hard chalk. The design of the building chiefly exhibits the characteristics of the Early Decorated style. The nave is lighted from the west by a window of five lights and twelve clerestory windows, six on the north and a similar number on the southern side. The chancel is lighted by five narrow lancet-windows, each with tracery in the head. The northern aisle has three square-shaped windows of three lights each, and the south has two of a similar character. The aisles also have each one window of two lights in their eastern and western terminations. The nave and aisles are separated by six arches (three on either side), which rest upon pillars of dark-veined Devonshire marble, the caps and bases being of Caen stone. The shafts of the corbels which carry the chancel arch are of the same material as the nave pillars, &c. The pillars are so constructed in the nave that their bases are raised above the pews, thus rendering them somewhat short in appearance. Above the vestry and beneath the belfry floor of the tower there is an opening for an organ. The seats, which are of deal, stained to imitate oak, are open, and will accommodate 452 adults and fifty-five children; total, 507. The roof is of the same material as the pews. The floor is formed of black and buff encaustic tiles, laid in lozenges. The capital of the chancel corbel, on the north side, has been carved to represent hawthorn blossom and sycamore leaves; and that on the south, lilies and ground-ivy leaves. The caps of the two columns of the north aisle represent respectively roses and columbines, and those of the south maple leaves and passion-flowers. The execution of this department of the works was carried out by Mr. Farmer, of Westminster, the carvers being young men and lads from his establishment. The font, which occupies a recess in the west end of the south aisle, is in the Early English style. The pedestal is a cluster of four columns, upon which the bowl, carved out of a block of stone, rests. The bowl is octagonal in shape, four sides being plain, and the remaining ones (the alternate spaces) decorated.

North Nibley (Gloucestershire).—The chancel of the parish church of this place has been rebuilt. The new chancel is built in the Early English style. The architect was Mr. J. L. Pearson, of London; and the builder, Mr. Charles Jackson, of Uley. The carving was executed by Mr. Nicholls, of London. The tiles of the chancel floor are from the establishment of Messrs. Maws.

Aberdare.—A new Unitarian chapel has been opened at Aberdare. The edifice was built from the design of Mr. H. J. Paull, of Cardiff. It is a Gothic structure, 54 feet long, by 28 feet wide, lighted by three windows, of different patterns, on each side, and is capable of seating about 250 persons, irrespective of a singing-gallery at one end. The seats are stained and varnished. The estimated cost, including enclosures, railing, warming, lighting apparatus, &c., is 1,045*l.*

Fenny Drayton (Leicestershire).—This church, having undergone a general reparation, was re-opened on Wednesday, the 2nd instant. It presented a curious example (before the restoration commenced) of the treatment to which such buildings have been subjected for several generations. It was covered, nave and aisles, by one low-pitched roof, and lighted by a skylight! The chancel window was gone, and its place supplied by a square opening; and its walls were dilapidated and patched with stucco: in the interior, also, all the features so well known, and now, happily, so fast passing away, were visible; the low, plastered ceiling, and the high, ugly pews. The old roof has been replaced by new ones, of higher pitch, over the nave and south aisle (the north aisle being left for lack of funds). The walls have been cleared of stucco, and partly rebuilt, with gable copings and crosses, and new east window. Internally the floor has been entirely relaid with Staffordshire tiles, and Nopton stone steps in the chancel. The old pews have been removed, and replaced by carved stalls in the chancel, and open benches in the body of the church. A new chancel arch, with responds, supplies the place of the wooden beam which finished the old ceiling; a new tower arch, that of the old "singers' gallery," and a new porch, built of stone, that of the old brick porch. Fenny Drayton was the birthplace of George Fox, the founder of the Society of Friends. The church contains four very handsome alabaster monuments to various members of the Purefoy family. The architect is Mr. W. Jackson, of Leicester; and the works were executed by Messrs. Haddon & Merideth, of Atherstone. The restoration is due to the energy of the new rector, the Rev. J. E. Colyer, assisted by subscription.

TO "THE GARGOYLE OF ST. MARY ANNE'S."

I FEAR that I cannot endorse the application of this griffin to the position he covets in the plate of good grotesques which I recommended the Architectural Publication Society to publish. I shrewdly suspect him to be an impostor,—a restoration at best, or one of the sham gargoyles of the Gothic churches of twenty years ago, to most of which his description of himself will apply, and which need no stomachs, having often no water laid on to them at all.

He evidently forgets his purpose altogether,—I had said his position also, but that he speaks of himself as "flanking the turret that flanks the tower." Now he was banished to that elevated spot simply because he was not "ornamental," nor any personification of Christian graces, but a devil incarnate, abhorred as such, and stuck up as a grim reminder of the sad end that bad men, as well as bad spirits, must come to, if they turn not from their evil ways; and also for the behoof of the passers-by in the "crooked alleys" below, which, by the way, have grown up since the time he purports to be of, and in the true "dark ages," which recked not of art and huddled shops under the very eaves of St. Mary Anne's, and would have, if they might, made merchandize in the nave itself, and even stabled cattle in its choir. Of these dark ages, other than Mediæval, I may have more to say anon.

Although I cannot deny that some of this griffin's unseemly crew have crept in, unawares perhaps, under sundry stall seats; yet it was no like of such as he that the old church-builders set up where they would have their sculptures to be read. And no "bad lot" were they, as he calls them, of "bare-footed friars," seeking to "scare a brutish and down-trodden people," but the sole guardians in those days of the same true faith which we hold, though it be they mixed error with it, and the sole protectors of the people who were "down trodden" by their kings and nobles. Far more stately than the senseless griffin "janitors of the Augustan porch," stand, in their ordered ranks, within the noble portals of Amiens, Rheims, and Rouen, the whole hierarchy of heaven and saints of earth, in adoration of the sublimest themes our glorious Christian faith can give, sculptured in the tympana with more than all the skill, and ten times the intelligence and true feeling of art, shown by the *ornamental compositions* of the classic ages.

JOHN P. SEDDON.

THE ARRANGEMENT OF THEATRICAL STAGES.

IT is curious that in England, where the application of machinery is more advanced than in any other country, the theatrical stages are perhaps the most ill-arranged and old-fashioned of any part of Europe; and it is more so, since scene-painting is perhaps nowhere so perfect as here. I cannot, therefore, do better than refer our architects to the newest and best Continental stages. The most perfect and simple stage machinery I know is in the new Victoria Theatre at Berlin. Sections and drawings of this stage are published, and of such a nature, that they will fully explain the whole to any architect; hence will not necessitate his going to Berlin. This work might be obtained through Messrs. Williams & Norgate, of Henrietta-street. In this house all is done below the stage, and no workmen are required up above: with one wheel the whole side scenes and drops are set in motion, by the aid of weights; the wings are on frames, which go through the stage, and run on a frame below. On each side of the stage there are several shafts, which contain boxes, and which go from the bottom to top of stage. Hence, if a man below requires to go up above, he has only to jump into one and set himself in motion, and in a few seconds he is at the top of the house.

Another new house is at Brunswick. A very interesting theatre is at Mannheim, where Mr. Mühldorfer is machinist, inventor of the flat stages, and holds the highest reputation in Germany. Also at Munich the theatre is most interesting: there is an immense stage, and as warm and free from draughts as a drawing-room.

This stage is of a peculiar construction, and all its details are published in admirable drawings. The Italian stages are very old-fashioned; but Paris, with its many new theatres about to be built, will be very interesting. Then will be tried an experiment of great interest to actors, viz., of getting rid of the footlights, which are so annoying. I am sorry not to be able to send you the drawings of the Victoria Theatre, Berlin, or of Munich, but should any of your readers have the former, they could not be rendering the architectural world a greater service than by lending them to you, in order that you might publish two sections of the stage.

Any one travelling to see theatres should visit also Carlsruhe, Darmstadt, Hanover, Warsaw (Warsaw has the most perfect garderobe arrangement I know), Moscow, Bucharest, and above all, St. Petersburg, for gorgeousness.

The question of flat stages *versus* inclined is an interesting subject: in inclined stages everything is out of perpendicular.

ALPHONSE WARINGTON.

WOMAN'S AID IN LARGE TOWNS.

DEAR MR. EDITOR,—There is an old Scotch proverb, that "Mony a little makes a mickle." Might we not *all* (we women I mean) try what we could do towards building at least one of your social bridges? I do not venture to ask this with reference to myself; being, alas! very helpless in such matters, though I would thankfully do anything I could; but your correspondent of the 5th instant seemed to limit the work to those women whose friends are more immediately interested in it. Is this necessary? It has often struck me that there are many ladies who have the means who would be glad to give for such a purpose; many who visit among the poor, and many others whose pity would be roused if they were appealed to. Often they are only deterred from giving by not knowing how or where to begin: it is so difficult in London for ladies to know much of their poor neighbours. If you would make a strong appeal to them, as you best know how, I cannot help thinking it would be warmly responded to, and the work zealously taken up by some when once made acquainted with the need. We have sighed long enough over the sad pictures you have been painting for years: it would be a real comfort to feel that we were, at all events, trying to do something more to the purpose. You will forgive me for troubling you when so many others can make far better suggestions; but I have so long felt that we might often be *doing* while we are only *dreaming*, that I could not resist asking this question. E. P.

FIRES IN CHURCHES.

THE harvest season for the usual stove-fire accidents in churches is now in full "swing:" the following is a good week's gleaning from the perennial crops. How many winters must there pass before these numerous "accidents" lead to their own remedy? The parish church of Aberlour, in Banffshire, has been totally destroyed, together with the vestry, but not the clock-tower, by a fire which, says the *Banffshire Journal*, "must have been from the stove which heats the church, and which was in operation."——The parish church of Cranstoun, near Dalkeith, has been totally destroyed by fire, "supposed to have originated in overheating."——A fire occurred in a church in Parliamentary-road, Glasgow, last week, but was extinguished, fortunately, without doing any material damage: "it was found that the alarm had proceeded from the gallery, where the vent leading from the stove beneath, which had been overheated, had ignited a lintel, the flame of which melted a small gas-pipe and ignited the gas." A stove pipe, a wooden lintel, and a gas-pipe, all in juxtaposition! It reminds one of the handy housemaid, who over-night carefully lays the firewood over the paper, and the fuel over the firewood, for the morning's fire!——On the same day, and in the same city, at a church in New City-road, "the beadle discovered that a portion of *the wood connected with the stove* had taken fire, from the stove being over-heated;" but fortunately the discovery was also a timely one, and the fire was extinguished. Why should "the wood" be "connected with the stove" in any case, except through a considerable and safe intercalation of iron or other incombustible material.——Salem Chapel, Burton-on-Trent, has been completely gutted by fire, and most of the roof destroyed.——The organ at Trinity Church, Bromwich, has been burnt; but in this case a gas jet, carelessly left burning, is blamed.

COLD FROM OPEN CHURCH ROOFS.

CAN any of your correspondents inform me how the inconvenience of an open roof in the very coldest of all parish churches can be rectified? We have lately enlarged and repaired our church at an expense of from 3,000*l.* to 4,000*l.*, and it is now scarcely bearable from the currents of cold air that flow downward, so that a candle will not burn within a few feet of the roof. A new plan of warming was recommended by the architect, but the flues are so embedded in the earth, and covered by the pavement, that no heat arises, except at the furnace doors, which are placed just at the porch entrances, so that it is soon neutralized.

The restoration committee, all good men in their way, had no experience of contracts, and engaged an architect from London, and then gave the contract to a carpenter who had not 5*l.* capital, because he offered to perform it at nearly 200*l.* less than the other builders: he has become a bankrupt; and, to make things worse, has not even paid his weekly workmen.

This should be a caution to other committees.

DEVON.

*** Is the roof felted? If not, felt would lessen the evil complained of. If that prove insufficient (all openings and crevices having been of course stopped), lathing and plastering between the rafters, so as to interpose a layer of air next the outer covering, is probably the best thing that could be done.

WORKS AT WINCHESTER CATHEDRAL.

SOME of our correspondents continue to complain of unnecessary scrapings and choppings at Winchester, and of the new figure recently put up. We must withhold our opinion at present. One letter, purporting to come from the Cathedral itself, says,—"Painful, however, as all this scraping and patching is, it might be even excusable if the dean and chapter were suffering from a plethora of spare cash, and had completely finished all necessary matters before they looked about them for something to 'repair and beautify.' Unfortunately this is not the case. I am suffering from a chronic internal disease, which prevents my being as useful as I could wish to my friends. In fact, the system of 'respect of persons' is carried out in all its pew-rity in my interior. It grieves me extremely to be so long a victim to this malady, from which many of my sister cathedrals have recovered; for there is no lack in my native city of those over whom neither I nor my smaller sisters in the parishes have any hold, and whom I would fain invite and welcome.

I say nothing of the unsatisfactory state of my furniture and ornaments; nor of my lantern—which has been put out for many years—a very handsome one, given me in Henry I.'s time, in place of another (by Walkelin & Co.), which I unluckily dropped and broke. But a circumstance which I will now relate to you makes me feel very uneasy about my future, and wish that the money now gone had been spent on internal remedies. A little bird has told me that the present members of the chapter, with a praiseworthy regard to their own interests, have declined burdening their divisible revenues for the repair of the fabric: and that a something has passed between them and the Ecclesiastical Commissioners which will cause their successors to hear another something, by no means to their advantage. I hope, for the credit of this unselfish, earnest, evangelical, tea-and-Bible-loving town, that the little bird was mistaken. WINCHESTER CATHEDRAL."

ARCHITECTS' ACTIONS.

EXCEEDING STIPULATED COST.

AT the Court of Passage, at Liverpool, on Saturday week, an action was brought by Mr. Thomas Wylie, architect, against Mr. Edward Willmer, proprietor of the local *Chronicle*, to recover the sum of 158*l.* 15*s.*, being 2½ per cent. commission upon 6,350*l.*, the estimated cost of a building for which he had prepared the plans. The plaintiff stated that in August last the defendant purchased from the trustees of the Blue-coat School the lease of a plot of land in School-lane, and engaged him to prepare plans for a building to be erected upon it. He accordingly commenced the preparation of plans; and, whilst he was engaged upon them, Mr. Willmer told him to put himself in communication with the proprietors of the *Mercury*, who had agreed to take a portion of the building, and so to arrange the building as to afford them the accommodation they required. It had previously been contemplated to erect a building of two stories, but Mr. Willmer now said it must be a four-story building, with a cellar. He then proceeded to make fresh plans; and, during their preparation, the defendant came to the office almost every day. When the plans were completed he sent them, under Mr. Willmer's directions, to Messrs. Howarth, of Lime-street, in order that they might take out the quantities. On the 3rd of November he received a letter from Mr. Willmer, in which he drew attention to his having stated that he contemplated expending about 2,000*l.* on the proposed erection, and having subsequently extended that sum to 2,500*l.*; and said he expected the plans to be executed for an expenditure of that amount, and was therefore astonished to find that the tenders which had been sought for carrying out these plans ranged from 6,350*l.* to 6,433*l.* The defence was that Mr. Wylie received instructions to prepare plans for a building the cost of which was not to exceed 2,500*l.*; and, that as he had not carried out these instructions, but made plans for a building to cost 6,300*l.*, which were perfectly useless to the defendant, he had no claim. The jury, after a protracted investigation, gave a verdict for the defendant.

Books Received.

VARIORUM.

MR. WILLIAM CHAMBERS has printed his lecture on Co-operation (noticed on page 773 of last volume of the *Builder*), in the form of a two-penny tract, the first of a series titled "Chambers's Social Science Tracts" (W. & R. Chambers, London and Edinburgh). The subject of Co-operative Associations amongst the working classes, especially with the view of acquiring cheap and good provisions and other requisites, is now exciting considerable attention throughout the country, and Mr. Chambers's is by far the best exposition of this subject which we have yet seen. His tract properly recommends caution in the extension of that branch of co-operation which deals in manufactures, such as that of cotton: nevertheless, it gives a hopeful view of co-operation as an engine of social advancement.——A very sensible little sixpenny tract, titled "Health in Nature: a practical treatise, showing how 'good digestion waits on appetite, and health on both,'" has been "addressed to the common-sense portion of the British public, by A Convalescent" (Davey, Lewes, publisher). We quite agree with the sagacious author in thinking that "anything that will put a check upon the present system of drug medication is desirable," and his object is to show how much can be done by rational and simple means, without resort to drugs. Still he does not go to the other extreme of disclaiming the aid of medicines where really requisite under administration by enlightened medical authority; but, as he rightly remarks, "fresh air, exercise, simple diet, the non-use of stimulating drinks, cleanliness, or that which promotes a healthy action of the skin, and a mind free of care, are the grand points that conduce to health." On the necessity of a due supply of fresh air as essential to a healthy existence, the author more than once impressively expatiates. "That man," he remarks, "will deserve well of his country who will teach us how to warm our dwellings and at the same time ventilate them efficiently and cheaply." This is an important question to which we have repeatedly drawn attention in the *Builder*, as well as to the invisible poison drunk into the lungs in close apartments, and in ball-rooms, theatres, and other places of public resort.——A paper, by Dr. Wallace, one of the surgeons of the Greenock Infirmary, "On some of the Causes of the High Rate of Mortality in Greenock," read at the Social Science Congress, at Glasgow, in September last, as noticed by us at the time, has now, by recommendation of the council, been published for local circulation, together with an able reply to the strictures on its statements made both at the congress meetings, and since, in a printed form. That Greenock is, sanitarily speaking, in a very bad state indeed, has been clearly proved by statistical evidence, although no one familiar with the condition of notoriously unwholesome localities in towns can require any other evidence than that of their own senses to be convinced that it is so; and it is not of late years alone that Greenock has become decidedly bad in a sanitary point of view: it was a very nasty place, so far as we can recollect, some years since; and time seems only to have intensified the causes of its disrepute, notwithstanding its favourable position with respect to rainfall for cleansing operations. That even the Registrar General's adverse statistics are resisted by some well-meaning persons, anxious to redeem their favourite locality from obloquy, is not to be wondered at: there is no place, however bad, however notorious for ill-health, which has not defenders ready to start up in its favour, and to support the dirty and unwholesome side of the question. It is to be hoped, however, that the local authorities and inhabitants will not allow the present state of matters to continue much longer without amendment.——"Who's who, in 1861?" edited by C. H. Oakes, M.A. (Baily, Brothers, Cornhill), is as useful a little work as ever, but it requires extension. Should any one wish to know, for example, who Michael Faraday is, he will find, by turning up "Who's who?" that Michael Faraday is nobody: in other words, he will not find him here

at all. So with Charles Dickens: so with almost every man of talent or genius who has made himself celebrated, but who happens not to have an aristocratic or official handle to his name. Sir John Herschell is somebody,—not because he is a great astronomer, eminent, also, in other sciences; but because he was "created" out of a nobody into a somebody in 1838. This, in short, is a work which regards everybody as nobody, unless he have some special distinction of title or office. It does not include men of mark in science, art, or literature, however well known or celebrated they may be. Surely a few lists, at least, such as those of the Royal Society, and other distinguished associations, might be appropriately and easily added to those already included, such as the lists of military and naval officers, police magistrates, county court and bankruptcy judges, and other legal authorities, assurance companies, railway directors, &c., &c.;—and especially since a good precedent exists in its own pages by the very exceptional insertion of the list of Royal Academicians.

Miscellanea.

ARCHITECTURAL PHOTOGRAPHIC SOCIETY.—The opening Conversazione in the gallery, Conduit-street, on Tuesday evening, was well attended, and passed off agreeably. Mr. I'Anson briefly explained the object of the association, and pointed out a few of the photographs.

FOLEY'S STATUE OF LORD HARDINGE. — We are glad to find that the committee formed to obtain for the metropolis a duplicate of this fine work are proceeding with good success. About 250*l.* have been subscribed by artists only. A general committee will now be formed, and an appeal made to the public. Messrs. David Roberts, R.A., W. Calder Marshall, R.A., Daniel Maclise, R.A., and P. Macdowell, R.A., are the honorary secretaries, and may be addressed at 22, Regent-street.

PURIFICATION OF THE WATER OF LEITH AT EDINBURGH.—This very necessary work is said to be at present under the consideration of the local authorities. A great portion of the west end and new town of Edinburgh is drained into the bed of the very small stream called the Water of Leith, which, in summer, is often pretty nearly dried up, so far as regards its legitimate dimensions; so that the channel then becomes, as it now is, indeed, at all times, a filthy open sewer, which disembogues itself into Leith harbour. The greater epidemic mortality of Leith than of Edinburgh, and of Stockbridge and Water of Leith village than of Edinburgh in general, has been regarded at various periods as due in part at least to their situation on the banks of this stream. Such is the view taken, not unnaturally, by the Leith Sanitary Association, who are very properly stirring in the matter.

THE ANCIENT CHURCH OF RECULVER.—Our readers will remember that the now ruined church of Reculver inclosed within its fabric parts of a building far more ancient than the towers and walls which formed the exterior of the structure; in fact, there appears to be no doubt that a portion of a Roman temple or basilica, which was still erect in the thirteenth century, and which, judging from its relics, must have been an important building, was appropriated by the Mediæval architects, and incorporated in their rising edifice. These portions, consisting of two columns, giving, with the side walls, support to three arches, were situate at the junction of the nave and chancel, the whole structure forming a triple chancel arch of much singularity. At the commencement of the present century the church was reduced to its present desolate condition, parts being distributed to various claimants, and at this time the columns passed into the hands of a citizen at Canterbury, who caused them to be laid on the grass of his orchard, where they have remained to the present day. The orchard, among the long grass of which the columns have for so long a period slumbered, having recently been sold for building purposes, has been made accessible to the public, and here these remains of ancient "Regulbium" were seen and recognized by Mr. Shepherd, surgeon, of Canterbury, who immediately communicated with Mr. Roach Smith, and he in turn lost no time in drawing the attention of the authorities to the matter. The result has been that the Dean of Canterbury, conferring with Canons Robertson and Stone, has proposed to re-erect the pillars, which have been freely given by their owner, Mr. W. J. Cooper, in the precinct of the cathedral. It would be better to erect them near the old church whence they came.

GLASGOW ARCHÆOLOGICAL SOCIETY.—The usual monthly meeting of this society was held on Monday night; Mr. Sheriff Strathern, V.P., in the chair. Several new members having been elected, the chairman read an elaborate paper "On the Origin, Coronation, and Jurisdiction of the Lord Lyon King of Arms," in which he also traced the history of heraldry in Scotland from the earliest times.

FATAL ACCIDENT.—Last year a quantity of earth having fallen at the Terres, Guernsey, a wall was being built for protection, when, on the 11th inst. another landslip occurred, burying with it three men, who were occupied in building this safe-guard. Means were quickly taken to extricate them, but one was quite dead, another seriously hurt. The father of the dead workman shared a similar fate thirteen years ago. The accident is attributed to the severe frost.

"SAFETY RAILWAYS." — Letters patent have been taken out by Mr. Thomas Wright, of London, C.E., for a system of "safety rails," with safety kerb, external to the rails, for preventing the engine and carriages from running off the line, and life-guard affixed to each corner of the carriages, engines, and tenders, and converting them, in the event of the wheels giving way, into sledges, moving along the safety kerb, the life-guards acting as skids or breaks to aid in stopping the train, while also preventing it from upsetting or quitting the line and falling over embankments, viaducts, &c.

SCHOOLS OF ART.—The first annual meeting of the Bridgwater School has just been held. The committee's report states that good progress has been made; the number of pupils attending the central school being ninety-five, and those in public schools connected with the School of Art, being 220. The annual expenses have been 168*l.*, and the pupils' fees already nearly cover this amount, being 155*l.*——The prizes and medals at the Brighton and Sussex School have been distributed, but the usual annual meeting was not held on this occasion. There are about 1,400 pupils in all connected with the school; but, of these, 800 belong to the National and other schools in Brighton. Eighty-one prizes have been awarded, besides nine medals.

LAMBETH SCHOOL OF ART.—A conversazione was held at the South Kensington Museum, on Saturday evening, 12th January, to promote the building fund of the Lambeth School of Art. The band of the 1st Middlesex Engineer Volunteers, and the band of the 37th Middlesex (the Bloomsbury), played during the evening. It was exceedingly well attended, nearly 3,000 persons being present.

"AUTHORS OF THE AGE."—We are led to mention that the lectures on this subject by Mr. S. C. Hall, the accomplished editor of the *Art Journal*, of the interest of which we have already had occasion to speak in warm terms, are about to be condensed into one lecture, and delivered by Mr. Hall, at the Royal Institution, Liverpool, on Friday, the 25th of January. Although there were redundant words in these lectures, there can be no doubt that a condensation of the whole into one lecture implies a decided concentration of interest as well. It really is startling to find a man who can speak from personal knowledge, and ably too, of so many dead (yet living) worthies, from Hannah More to Lady Morgan. The more enlightened classes among the people of Liverpool have here a treat in store for them, and after enjoying it, they will be grateful to us and all who thus give them timely notice of its approach.

NEWSPAPER STATISTICS.—From the "Newspaper Press Directory" for 1861, we extract the following on the present position of the newspaper press:—"There are now published in the United Kingdom 1,102 newspapers, distributed as follows:

England	791
Wales	28
Scotland	138
Ireland	132
British Isles	13

Of these there are—

39	Daily papers published in	England
8	ditto	Scotland
12	ditto	Ireland
2	ditto	British Isles.

On reference to preceding editions of this useful Directory, we find the following interesting facts; namely, that in

			Journals.
1821	there were published in the	United Kingdom	267
1831	ditto	ditto	295
1841	ditto	ditto	472
1851	ditto	ditto	563

but in 1861 there are now established and circulated 1,102 papers. The magazines now in course of publication, including the quarterly reviews, number 481.

PROPOSED MONUMENT TO JOHN KNOX.—Preliminary steps have been taken with the view to the erection of a monument to Knox, at Haddington, which competes with Gifford as his birthplace.

PROPOSED MEMORIAL TO THE LATE LORD DALHOUSIE.—It is proposed to establish at Calcutta a memorial of Lord Dalhousie. The memorial will take the shape of an Athenæum, or literary institute. The structure is to consist of a central hall, for the reception of statues and busts, and suitable for public meetings and concerts, with lecture and reading rooms, library, orchestra, and organ, together with miscellaneous meeting and accommodation rooms. The building will be located on a plot of ground to the eastward of the government-house gardens. The designs are open to architects both in England and India, and the competition, in connection with which prizes are offered, will be open until the end of March.

THE MAUVE COLOURS. — We have ere now spoken of the wonderful variety of products from coal and coal-tar; but it is well to be reminded of the source of some of the beautiful new colours, as in the *Dilettante Review*, which thus speaks of them:—The great interest that attaches to these colours does not consist in their novelty only, but in the fact of their being produced from *coal*; and in their importance, technically speaking, as permanent and beautiful dyes. The production of the Mauve dye reposes upon that of a very remarkable substance called Aniline, which is found in gas-tar, but only in minute quantities. A host of curious compounds have been found in gas-tar, and among them Aniline which, in a pure state, appears as an oily transparent liquid, possessing properties such as characterize those substances called "alkaloids," such as quinine, strychnine, nicotine, &c. It would probably form a medicine similar in its effects to sulphate of quinine; but at present science has only called upon it to yield dies of a beauty never witnessed before its discovery. The great merit of the mauve dye is the beauty and permanency of the tints which it imparts. Its power of coloration is so great that a small quantity of it gives colour to a large number of vats. While coal would hardly sell at one farthing per pound, a similar weight of Aniline dye is said to be worth from 60*l.* to 80*l.* sterling!

THE CO-OPERATIVE MOVEMENT.— Rochdale appears to be a prominent leader in this movement; which, if discreetly carried out, cannot but be of great and permanent benefit to the working-classes, so far as cheap and good provisions, clothing, and other necessaries are concerned; over and above which the co-operative stores enable the workmen to retain for themselves such profits as shopkeepers and other non-producing "middle-men," as they have been called, usually appropriate to themselves out of the hard earnings of their working-class customers. The transactions at the Rochdale co-operative store during the year 1860, as just shown at the annual meeting of the copartners, amounted to 152,063*l.* received for goods sold, being an increase of 48,061*l.* over 1859. The profits for the year had been 15,906*l.* 9s. 11d., on a capital of 37,710*l.* 9s., or nearly 33 per cent. Another branch store had been opened within the last few days of the close of the year at Bluepits. The District Corn Mill Society showed at the close of its year, the 22nd December last, a capital of 26,618*l.* 14s. 6d., the amount of business done 133,125*l.*, and the profit 10,164*l.* 12s. 5d. In the butchering department of the store it appeared that 2,485 cattle had been killed, giving 505,532 lbs. of meat. The flour sold at the store and its branches had been 13,162 sacks of 280 lbs. each. The extent to which the store had acted as a savings' bank was shown by the fact that 3,353*l.* 3s. 6d. had been paid in as deposits by members, and the sums accumulated for withdrawal to suit convenience had been on the year 15,813*l.* 4s. 6d.——The third quarterly report of the Stockport Industrial and Equitable Co-operative Society, just published, shows how rapidly the system is gaining ground in this borough. The committee announce that 429 new members have been added during the quarter ending 29th December, making the progressive number 754; whilst the receipts have increased from 300*l.* to 600*l.* per week, being exactly doubled, with the addition of 1,270*l.* 6s. 5d. to the paid-up capital, making the capital of the society 2,442*l.* 9s. 4d.——The building for the Winsford Co-operative Store, at Warrington, is partly erected, and the working-men are anxiously looking forward for its completion.——At Wigan and at Portsmouth the movement is making satisfactory progress.

ROOFING THE ROYAL EXCHANGE.—It will be remembered that the Committee on Gresham Affairs advertised for designs for roofing the Royal Exchange, London, with glass. Thirty-three designs have been sent in, and it is arranged that the duty of selecting from among them the three most desirable, so as to enable the committee to award the prizes and choose the one for final adoption, shall be confided to the Lord Mayor and the Master of the Mercers' Company, with liberty to call to their assistance Mr. Tite, the architect of the Exchange, and the architect of the Mercers' Company. Why did not Mr. Tite make the design himself?

SWALLOWING A YARD OF LAND!—"Dick, let's have a pint of beer," said a railway "navvie" to his mate. "Nay, Jack, I can't afford to drink a square yard of good land, worth 60*l.* 10s. an acre." "What's that you're saying, Dick?" "Why, every time you spend threepence in beer, you spend what would buy a *square yard of land*. Look here:—[*Dick takes a piece of chalk out of his pocket and begins to make figures on his spade.*] There are 4,840 square yards in an acre: threepence is one-fourth of a shilling: divide 4,840 yards by 4: that gives 1,210 shillings. Now divide that by 20 (there being 20s. to the 1*l.*), and there you have a 60*l.* 10s., which is the cost of an acre of good land, at threepence a square yard!" —*British Workman.*

EFFECTS OF THE SEVERE FROST ON METALS.—A wrought-iron lever, 2½ inches thick, which worked a signal at the Chatham station of the London, Chatham, and Dover railway, snapped in two "like a tobacco-pipe," as the signal-man described it, while in use during the frost; and a large brass bell, at the Woolwich Arsenal, which has rung the labourers to and from their work for 160 years, was split by its hammer about the same time. The breaking of axles and tires, and other accidents, which have been so frequent during the frost, are also partly attributable to the effect of the severe cold on the metals, and so may the running of trains off the rails, from tightness of fit as supposed; the metal of the wheels and axles contracting under the influence of the frost. Such accidents have been alarmingly numerous of late. It is to be hoped iron girders and bridges run no risk of similar disasters. Copper would not be so liable to become brittle in frost as iron or steel, and could no doubt easily be adapted to tires and axles, at least as an additional support.

INDIAN RAILWAYS.—We have already mentioned that the Institution of Civil Engineers awarded a Telford gold medal and a council premium of books to Mr. James J. Berkley for a paper "On Indian Railways, with a Description of the Great Indian Peninsula Railway." The author is chief engineer to the Great India Peninsula Railway Company, whose service he entered in the year 1849. The projects comprise the two railway inclines up the Syhadrees or Ghauts of Western India. One of these—the Bhore Ghaut incline—is rapidly drawing towards completion. It contains twenty-five tunnels through basaltic rock within the short space of thirteen miles. Upwards of 32,000 men are employed upon it under Messrs. Adamson & Clowser, the managers for the contractors, Messrs. Tredwell. To give some conception of the magnitude of the works, we may mention that, in the month of November, five tons of gunpowder per diem were consumed, and that work to the amount of 40,000*l.* was executed within one month.

KILKENNY ARCHÆOLOGICAL SOCIETY. — The eleventh annual meeting of this Association, was held on the 2nd inst. Several new members were elected, and the report of the committee, for the year 1860, announced the election of fifty-eight new members since the 1st of January, 1860; making the aggregate of members 608, of whom thirty had compounded for life. The committee, it continued, "are glad to report that much has been done during last summer to remove obstructions which disfigured the noble architectural remains of Jerpoint Abbey, and secure their preservation. The wall which stretched across the nave of the abbey church has been removed, thus throwing open the view from east to west. A portion of ground, including the site of the south side aisle of the nave, has been purchased from squatters, enabling the committee to take down the enclosing wall built when the abbey was lately under repair, and to remove it further south, so as to rescue from desecration the entire site of the abbey church: about enough land remains over to supply, by its annual rent, compensation to the caretaker. The thanks of the society are due to James S. Blake, esq., J.P., a member of the committee, for the judicious and careful manner in which he carried out these improvements."

COMPETITION: NEW CHURCH, ISLE OF MAN.—The Committee have selected the design of Mr. Manning, of Mitre-court Chambers, Temple, London. 27 designs were submitted.

THE TYNEMOUTH SURVEYORSHIP.—There were forty-three candidates for this post. Five were recommended to the council as eligible for election, and the decision was in favour of Mr. Robson, a local candidate. Mr. Frederick R. Wilson was second, and lost by two votes only.

THE LYCEUM THEATRE.—If there were nothing else at the Lyceum, the two great scenes in the Extravaganza, "Chrystabelle," would demand a visit. The last of the two, which Mr. Callcott, the inventor and painter, calls "The Vision of the Rose: its fading at Eve; and the May Bloom of the wild Briar," is exquisitely beautiful. The striking effects of colours and mechanical arrangements alike do credit to the inventor.

FREE LECTURES.—A Lecture on Science, Art, History, or Biography, every Tuesday evening, at Milton Schools, Milton-street, Cripplegate; a reading every Monday evening, at the Colonnade Club House, Clare-market; a lecture or oration on Monday evenings, at Surrey Chapel, Blackfriars-road; a lecture every Friday evening, at the Sailors' Institute, Mercer-street, Shadwell; a concert or lecture, on Tuesday evenings, at the Schoolroom, Honduras-street, Old-street; recitations, lectures, and readings, every Thursday evening, at the Tabernacle School-rooms, Praed-street, Paddington; all these entertainments are Free, and commence a little after eight o'clock each evening.

CENTRIFUGAL TURBINE.—A machine has been invented by Mr. J. Droctoxee, bailly of Bourges, which consists of a turbine, to which a rotating valve is adapted, furnished with a drum and grooved disc, receiving the paddles or float-boards, and moving with them a fixed distributor, a turrel or screw-ring fixing it to the boards of the water-chamber. The circle of contact is partly of leather, india-rubber, or gutta percha, and partly of segments of oak. The lower end of the hollow shaft on which the turbine is fixed, supported by a pivot, is bored conically to receive three bearings, and cylindrically to receive a disc. The conical-shaped part of the fixed axis rests in a support attached to the stonework, which is solidly cemented to the centre of the water-chamber. There are other specialities in the arrangements.

THE NEW CORN EXCHANGE, BURY ST. EDMUND'S.—The designs for the New Corn Exchange are hung up in the Town-hall for public inspection. There are twenty-one sets of plans, but we believe the committee, on Monday, reduced them to a small number, and we have no difficulty in naming, as in our opinion most desirable in style, those of Messrs. Bacon & Bell, Mr. F. Boreham, and Messrs. Ellis & Woodward, of London; Mr. J. Daymond Ellis, of Ipswich; and one which is subscribed "Invicta." The form generally adopted is a parallelogram, the internal area varying from 9,000 to 10,500 feet, leaving the ground not at present available to be dealt with hereafter for offices, rooms for exhibition of implements, a hall-keeper's residence, or other purposes; and for which front elevations are shown.—*Suffolk Chronicle.*

FINE ARTS IN IRELAND: TAYLOR PRIZES AND SCHOLARSHIP.—By the will of Mr. G. A. Taylor, late of Dublin, the sum of 2,000*l.* was placed at the disposal of his executors for the promotion of art in Ireland. In pursuance of his design, a perpetual endowment has been established for the encouragement of art-students, under the management of the Royal Dublin Society, in conjunction with the executors and trustees of the will for the time being. For the year 1861, the following prizes are offered, to be awarded at an exhibition to be held on the 30th of October, 1861, at the house of the Royal Dublin Society:—

1. For the best picture in oil colours, the subject historical or familiar £10
2. For the best landscape in oil colours 10
3. For the best composition in sculpture 10
4. For the best water-colour drawing (subject or landscape) 10
5. For the best agricultural drawing (elevation in perspective, with plans, of some known building, or a design) 7

The prizes may be increased or lowered in amount, or may be wholly withheld, according to the merit of the works exhibited. In addition, a student manifesting high artistic talent may obtain a Taylor scholarship of 20*l.* or more, which may be held for a second and third year, provided a work of adequate merit be produced in each year. All works must be delivered before two o'clock on Saturday, 21st October, 1861, at the house of the Royal Dublin Society, Kildare-street, Dublin, where, in the meantime, further particulars may be ascertained.

RAILWAYS.—The traffic receipts on railways in the United Kingdom for the year 1860 amounted, on 10,270 miles, to 27,576,783*l.*; and for the year 1859, on 9,880 miles, to 25,576,117*l.*; showing an increase of 390 miles, and of 2,000,666*l.* in the receipts, or 7·8 per cent.

PRESERVATION OF IRON PIPES.—A workman of Paris, it is said, has just discovered a means of preserving water and gas pipes from rust, by enveloping them in a thick coating of clay. The city of Paris is said to have granted the man a pension for life. Clay being so great an absorbent of water, there is something odd in this discovery, which, besides, requires some little time to establish ere a pension could well be earned.

TENDERS

For executing the paving works of the Whitechapel District for three years, at their schedule prices:—

West	at the schedule prices.
Mowlem & Co.	11 per cent. under.
Booth (Kingsland)*	6½ "
Booth (Bankside)	4 "
Crook & Son	1½ "

* Accepted.

For a new warehouse to be erected at Leicester, for Mr. Joseph Swaine. Mr. Francis Drake, architect. Quantities supplied. After deducting for the materials of old buildings:—

Chambers & Son	£797 0 0
Osborne, Brothers	772 0 0
Hill	770 0 0
Shillcock	752 0 0
Cox	750 0 0
Sketchley	720 0 0
Neale	685 0 0
Ashby (accepted)	656 0 0

For building stables and offices for the Yorkshire Coalowners, at King's-cross. Mr. J. Taylor, architect. Quantities supplied:—

Holland & Hannen	£7,280 0 0
Patrick	5,785 0 0
Langtree	5,647 0 0
Langmead	5,590 0 0
Wilson	5,500 0 0
Greenwood	5,300 0 0
Roberts	5,290 0 0

For five houses and shops at Chatham, Kent. Messrs. J. H. Andrews & Son, architects, Rochester:—

Sampson	£3,850 0 0
Tilley	3,759 0 0
Spicer	3,437 0 0
Naylor	3,290 0 0
Pankhurst	3,256 0 0
Jennings (accepted)	3,095 10 0

For Brightlingsea Schools. Mr. Charles Forster Hayward, London, architect:—

	School and House.	Fittings	Children's W.C. and Boundary-walls.	Total.
	£ s.	£ s.	£ s. d.	£ s.
Eade	760 0	93 0	103 0 0	956 0
Elsden	746 0	75 5	72 0 0	893 5
Orrin	734 0	78 0	67 0 0	879 0
Aldons, jun.*	728 10	76 0	74 15 0	879 5

* Accepted provisionally.

TO CORRESPONDENTS.

"AMERICAN NATURAL OILS."—We see no reason to question the fact alluded to by "W. H. E.," that mineral oils are obtained in the states of Pennsylvania and New York, either on the surface of water or by digging wells. The source of such oils in the interior of the earth's crust is probably the carboniferous strata (vegetable in origin, though mineralized), whence they may be slowly distilled by the heat which prevails at a certain depth, whether from superincumbent pressure or from central sources. Such oils are got from bituminous shale in Scotland by distillation. Burmese oil of a similar kind is now used, as is this shale oil, and so are various other forms of mineral oil, in this country, as a cheap material for lamps; and it is sometimes called liquid gas. In America it is now also coming into extensive use for lamps.

B.W.—J. G. N.—Mr. M.—G. F. T.—J. J.—B. G. H. (Bay Tree Tavern, St. Swithin's-lane).—C. W. (we are forced uniformly to decline. There is no good collection of the sort; but London, F. Goodwin, and Hunt's books may be looked to).—J.—Adelaide-road (the statement was erroneous. Freezing commences at the top).—J. H.—Hayward, Brothers.—N. S. E. W.—G. R. B. A. (next week).—* * ("Institute" letter was forwarded on Friday last.)—H. B.—Turkish Baths.—E. W.—Rev. J. W.—W. S.—W. R. C.—One of the Browns.—T. S. G.—D. R.—

TO SUBSCRIBERS.

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It is necessary to state whether the Advertisements are or are not to be bound in the Volume.

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